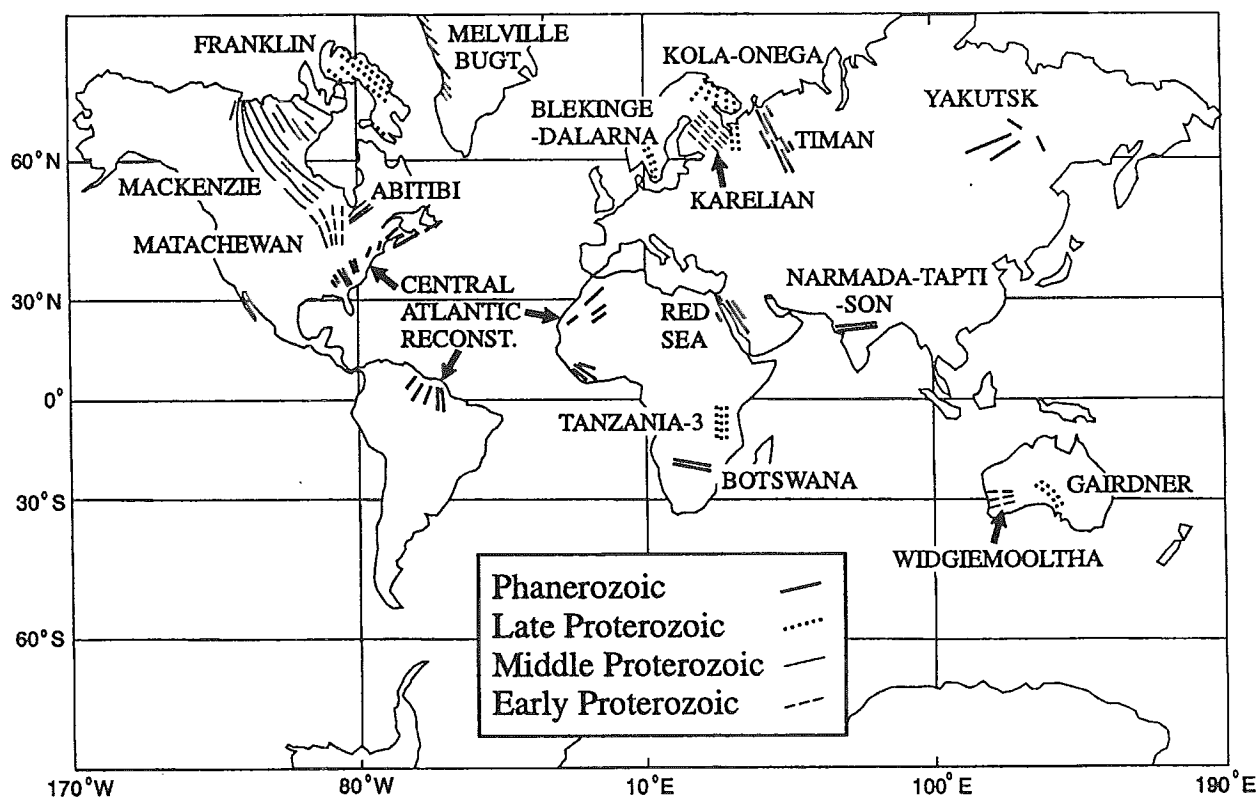


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Diabase (dolerite) dyke swarms of the world: first edition



R.E. Ernst, K.L. Buchan, T.D. West, H.C. Palmer

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Diabase (Dolerite) Dyke Swarms of the World: First Edition¹

Richard E. Ernst^{a,b}
Kenneth L. Buchan^a
Timothy D. West^a
H. Currie Palmer^b

^aGeological Survey of Canada, 601 Booth St., Ottawa, Ontario, CANADA K1A 0E8, rernst@gsc.emr.ca
& kbuchan@gsc.emr.ca

^bDept. of Earth Sciences, University of Western Ontario, London, Ontario, CANADA N6A 5B7

Abstract

Information from the literature on swarm geometry, geochronology and key references for more than 500 diabase (dolerite) dyke swarms from around the world are displayed on a 1:35,000,000 scale map and catalogued in a companion report. This compilation has so-far facilitated the identification of nearly 30 giant radiating swarms, the focal points of which are interpreted to locate mantle plume centres.

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Ernst, R.E., Buchan, K.L., West, T.D., and Palmer H.C. 1996. Diabase (Dolerite) Dyke Swarms of the World: First Edition. Geological Survey of Canada Open File 3241, includes map (scale 1:35,000,000 at the equator) and 104 page report.

ERRATA to GSC OPEN FILE 3241 "Diabase (Dolerite) Dyke Swarms of the World: First Edition"

date: 29 May 1997

Map Label	Original Version	Corrected Version
A1	Ameralik-Tarssastoq	Ameralik-Tarssartôq
A3	Step'N'Duck	Step'nduck
A6	Napatok	Napaktok
A6	Domes-Napatok	Domes-Napaktok
A26	(53°N, 94°W)	(48.5°N, 94°W)
A49	K 1635 ± 180	K 1490 ± 100
A66	Perhsson	Pehrsson
A116	Queen Charlotte Island	Queen Charlotte Islands
B13	Teixeira 1990 [540][397]	Teixeira 1990 [540]
C19	ref. for Laitakari & Leino 1989 is missing	ref. is: Laitakari, I., & Leino, H. (1989) A new model for the emplacement of the Häme diabase dyke swarm, central Finland. In S. Autio (Eds.), <u>Current Research 1988</u> (pp. 7-8). Geological Survey of Finland
C44	Johannson	Johansson
C45	Johannson	Johansson
E3	source to the SW	source to the SE
E17	Mashonaland-Sebanga	Sebanga
G18	West Faukland-1	West Falkland-1
entry after G18	West Faukland-2	West Falkland-2

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Introduction

This report, which was prepared for the Global Mafic Dyke GIS Database Project, catalogues information on the 523 diabase (dolerite) dyke swarms which are also displayed on the accompanying map. Another 157 swarms (and subswarms) are also listed but not displayed on the map due to space limitations or small swarm size.

The swarms represented in the compilation are broadly basaltic in composition and typically exhibit the diabasic or doleritic (ophitic, subophitic to intergranular) texture of coexisting plagioclase and pyroxene (e.g. Bates and Jackson 1980 [48]; Basaltic Volcanism Study Project 1981, pp. 368-369 [44]). The compositions range from tholeiite to weakly alkaline (e.g. alkali olivine basalt) and include metamorphosed equivalents. We also catalogue the important group of boninitic-noritic (high-Mg) swarms (e.g. Hall and Hughes 1987 [234], Bridgewater et al. 1995 [92]). Dykes associated with ophiolites and oceanic islands have not been systematically included. Strongly alkaline, lamprophyre, and kimberlite dykes are excluded.

Table 1 compiles geographical information about swarms (location, swarm size, trend, etc.), age constraints and key references.

In Table 2 swarms of approximately the same age are grouped into giant radiating patterns whose convergent points are thought to locate mantle plume (head) centres. The basis for this approach is discussed in Ernst et al. (1995a,b [182], [183]). Each of the case histories in Table 2 is detailed in Ernst and Buchan (subm. [181]) which explores the relationship between giant radiating dyke swarms, mantle plumes and large igneous provinces.

This publication represents the first global review of diabase (dolerite) dyke swarms. It is anticipated that subsequent editions will include additional swarms including those of ophiolite sheeted dyke complexes and oceanic islands as well as additional types of information such as petrology (petrography, geochemistry, isotope studies, degree of metamorphism), paleomagnetism, and related volcanic/plutonic units. Additions and corrections to the present edition are welcomed and should be addressed to REE or KLB. For easy location of the full citation in the reference list, each reference in the text and tables is accompanied by a locator number (in square brackets).

Acknowledgements

Information in this compilation derives primarily from the published literature. However, we are indebted to the many scientists from around the world who identified or provided key publications and maps, or who helped us to distinguish dyke swarms on a regional scale. We wish to especially thank Niels Abrahamsen, Tahar Aifa, Bob Baragar, Hewitt Bostock, Paul Budkewitsch, Ken Card, André Ciesielski, L. Correa-Gomes, John Craddock, Kent Condie, Piero Comin-Chiaramonti, Clay Conway, Tony Davidson, Andy Duncan, D.H. Elliot, Ron Emslie, Ingo Ermanovics, Marcia Ernesto, Moshe Eyal, Yehuda Eyal, Tony Frith, Sunil Gandhi, Henry Halls, Steve Harlan, Joe Hodych, Hans (J.D.) Hoek, Garth Jackson, Dai Jones, Steve Kumarapeli, Ilkka Laitakari, Tony LeCheminant, Jim Mortensen, Sasha Okrugin, E. Oliveira, John Parker, Lauri Pesonen, Rob Rainbird, M.I.B. Raposa, D.L. Reid, Peter Rickwood, Oleg Rosen, Marty Ross, Bruce Ryan, Nikolai Shatalov, John Sheraton, B.R. Shpount, George Snyder, Olaf Svenningsen, Wilson Teixeira, Misha Tomshin, Martin van Kranendonk, Jouni Vuollo, Marie-Claude Williamson, and Karl Wirth. Walter Fahrig's unpublished files, archived at the Geological Survey of Canada, have been useful in directing us to some important references on dykes of the Canadian Shield. Much feedback was obtained on a draft version of the map displayed at the 3rd International Dyke Conference meeting in September 1995 in Israel and the organizers of this conference, Gidi Baer and Ariel Heimann should be thanked for establishing an effective venue for collaboration. Bob Baragar has provided a detailed review of this publication; however any errors or omissions are our responsibility. We also thank the staff of the Geological Survey of Canada libraries, particularly Irène Kumar of the map library, Judith Boucher in interlibrary loan and Nina Aubé, Sari Burgoyne, Anne Dickason and Cheryl Love in circulation for assistance in locating maps and other references. REE and HCP received financial support from a LITHOPROBE CANADA grant. This publication is LITHOPROBE CANADA number 732.

Table 1: Catalogue of Diabase (Dolerite) Dyke Swarms of the World

The headings in Table 1 are explained as follows:

Map Label: For the purpose of this catalogue, landmasses of the world have been grouped under the following conventional "continent" labels (National Geographic Society, 1992 [391]): A = North America (including Greenland), B = South America, C = Europe (bounded on the east and south by the Ural Mountains and the Mediterranean, Black and Caspian seas; includes Svalbard), D = Asia (bounded on the west and southwest by the Ural Mountains, Caspian, Black and Red seas), E = Africa (bounded on the northeast by the Red Sea; includes Madagascar and the Seychelles Islands), F = Australia (includes New Zealand), G = Antarctica. Within each continent, dyke swarms are numbered in order of decreasing age.

Swarm Name: Alternative names are in parentheses, former names are in square brackets; swarms which appear to be unnamed have been assigned provisional names (underlined) for the purposes of this compilation. Names were typically drawn from nearby towns or rivers in which case the spelling is usually that given in the National Geographic Atlas of the World (National Geographic Atlas 1992 [391]). For swarms named after tectonic domains, the spelling has generally been drawn from Goodwin (1991 [219]). Entries which are indented and fronted by dashed lines represent separate portions of a swarm and in some cases may represent distinct subswarms (Ernst et al. 1995 [183]).

Location: Either the estimated geographic centre of the swarm, or a distinctive region of the swarm. Northeast, northwest, central etc. are abbreviated by ne., nw. and c. etc. Location is given as latitude, longitude.

Age: Age as reported in the literature. Entries are arranged in approximate order of decreasing age. Very poorly dated swarms are grouped in alphabetical order at the end of each table. Dating techniques includes U: U-Pb; R: Rb-Sr; K: K-Ar; A: Ar-Ar; S: Sm-Nd; G: geological correlation; P: paleomagnetic correlation to dated units or dated apparent polar wander paths. Where ages were reported in time-stratigraphic names (e.g. Jurassic), they have been converted to absolute age according to Okulitch 1995 [401].

Trend: Information on the trend(s) of dykes. The system is explained with a complicated example: 50° (40-70°), 100°, {330}, {NE-N}. There are four grouping of trends here. The main are 50° and 100° and the minor are 330° and NE-N. The range of the 50° set is 40-70°. Where possible, trend values are quoted between N to SSE or 0° to 179°, except when necessary, (e.g. a swarm fanning from NNE to NNW). For fanning swarms, trend polarity is chosen relative to the focal point.

Length and Width: Estimated to the nearest 50 km for the giant swarms (>300 km long) and to about 10 km for smaller swarms. In the case of fanning swarms, the **Length** value in parentheses is the maximum distance from the plume centre given in **Focus** and in Table 2. **Width** for swarms fanning more than approximately 100° is not given, but is usually listed for component subswarms.

Fan-Angle: Minimum angle of fanning. Isolated outlier dykes not included in calculation. Fan-angles <20° are not presented.

Focus or Source Direction: Focal point of a fanning swarm or direction to the magma source as given by flow directions determined from observed textures, dyke bifurcations, and/or magnetic fabric measurements. There are two exceptions. For the Grenville swarm (A84) the listed location is that of the pre-thrust position of the Tibbit Hill volcanics (thought to locate a mantle plume (St. Seymour & Kumarapeli 1995 [509])). For the Abitibi swarm (A67) the location is that of the Goodman Swell (Peterman and Sims 1988 [431]) for reasons discussed in Ernst et al. (1995 [183]).

Selected References: General references on the distribution and character of swarms as well as their age. References specifically chosen for geochronology are coded 'a' for age. The cited references are compiled at the end of the table. Numbers in square brackets provide an easy link to the full citations in the reference list.

Additional information is provided in **Notes** at the end of each (continent) section of the table.

Map Label	Swarm Name	Location	Age (Ma)	Trend	Length (km)	Width (km)	Fan Angle	Focus or Source Direction	Selected References ¹
<u>NORTH AMERICA</u>									
A1	Ameralik-Tarssastog	sw. Greenland (65.1°N, 50°W)	3400-3100	variable					Nielsen 1987 [394] Bridgewater et al. 1976 [91]
A2	Saglek	e. Canada ~ (58.5°N, 63°W)	G >2800	deformed					Collerson & Bridgewater 1979 [128] Van Kranendonk & Wardle 1995a [574] Van Kranendonk & Scott 1992 [572] a: B. Ryan (pers. comm. 1996)
	Hopedale	e. Canada (55.5°N, 59.8°W)	G 3100-2840	deformed					Ermanovics 1993 [172] Ryan 1995 [473] B. Ryan (pers. comm. 1996)
A3	Step'N'Duck	n. Canada (63°N, 112°W)	~2700	SE	20	3			Lambert et al. 1992 [324]
	Chan Formation-1	n. Canada (62.6°N, 114.3°W)	>2712	SSE					MacLachlan & Helmstaedt 1995 [346]
A4	Post-Kam (Chan Formation-2, unit 8)	n. Canada (62.6°N, 114.3°W)	2642-2620	N-NE					MacLachlan & Helmstaedt 1995 [346] Henderson & Brown 1966 [264]
A5	<u>Funger Lake</u>	s. Canada (50.5°N, 89.1°W)	G >2500	25° (20-50°)	12	20			Sutcliffe 1983, 1984, 1986, 1987 [525], [526], [527], [528]
A6	Napatok (Hebron, Domes-Napatok) (>1 swarm?)	e. Canada (58.6°N, 63°W)	2500-2100	E, (NE, SE)	60	140			Collerson & Bridgewater 1979 [128] Taylor 1975a,c [535], [537] Van Kranendonk et al. 1993 [571] Cadman & Ryan 1994 [103] Morgan 1975, 1978 [371], [372] Ermanovics & Van Kranendonk 1995a,b,c [174], [175], [176] Van Kranendonk & Scott 1992 [572] Scott 1995 [478]

	Mugford	e. Canada (57.8°N, 61.9°W)	2500-1600	350-10°	30	30			Ermanovics & Van Kranendonk 1995b [175]
A7	Ptarmigan	e. Canada (58°N, 72°W)	~2500	NNE	200	100			Buchan et al. in prep. [96]
A8	Mistassini	e. Canada (52°N, 74°W)	U ~2470	NW-NNW (fan)	400 (500)	250	35°	50°N, 71°W	Fahrig et al. 1986 [193] a: Heaman 1994 [257]
A9	Matachewan [Hearst]	s. Canada (48°N, 82°W)	U 2446±3 & U 2473+16/-9	N-NW (fan)	800 (1000)	450	40°	45°N, 81°W	Bates & Halls 1991 [47] West & Ernst 1991 [590] a: Heaman 1995 [258] Condie et al. 1987 [132] Nelson et al. 1990 [392] Ernst & Buchan subm. [181]
A10	Kaminak [Kazan]	c. Canada (62.3°N, 95.0°W)	U ~2450	10° (5-25°)	70	250			Christie et al. 1975 [123] Fahrig et al. 1984 [194] a:Heaman 1994 [257]
A11	Du Chef	e. Canada (49.5°N, 74.0°W)	U 2408±3	NE	130	60			Ciesielski & Madore 1989 [124] Madore 1991 [347] A. Ciesielski (pers. comm. 1995) a: Krogh 1994 [315]
A12	Tulemalu	c. Canada (62.4°N, 98°W)	~2400	ESE	150	100			Fahrig et al. 1984 [194] a: Fahrig & West 1986 [197]
A13	Kikkertavak (> 1 swarm?)	e. Canada (55°N, 61°W)	~2240	NE-NW	100	40			Cadman et al. 1993b [102] Ermanovics 1993 [172] Ermanovics 1990 [171]
	--CR			NNE					Cadman et al. 1993b [102]
	--KK		U 2235±2	N-NNE					Cadman et al. 1993b [102]
A14	Malley [Contwoyto]	n. Canada (64°N, 110°W)	U ~2230	NE	250	100			Frith 1987 [210] LeCheminant 1994 [329] Fahrig & West 1986 [197] Frith 1982a [208] a: LeCheminant & van Breemen 1994 [332]
A15	Klotz [New Quebec]	e. Canada (60.5°N, 73°W)	~2200	ESE	200 (550)	100			Buchan et al. in prep. [96]

A16	Maguire	e. Canada (58°N, 73°W)	~2200	E	100 (450)	50			Buchan et al. in prep. [96]
A17	Senneterre [Preissac, Abitibi]	s. Canada (49°N, 76°W)	U 2216+8/-4	NNE	300 (1400)	150			Buchan et al. 1993 [94]
A18	MacKay (X)	n. Canada (64°N, 108°W)	U ~2210	ENE-E	200				McGlynn & Irving 1975 [360] LeCheminant 1994 [329] Fahrig et al. 1984 [194] a: LeCheminant & van Breemen 1994 [332]
A19	<u>Indin-1</u>	n. Canada (64°N, 115°W)	~2200	SE	100	180			McGlynn & Irving 1975 [360] Henderson 1985 [263] a: Fahrig & West 1986 [197]
A20	<u>Indin-2</u>	n. Canada (64°N, 115°W)	~2200	NE	220	150			McGlynn & Irving 1975 [360] Henderson 1985 [263] a: Fahrig & West 1986 [197]
A21	Dogrib	n. Canada (63°N, 113°W)	~2200	ENE	150	75			McGlynn & Irving 1975 [360] Fahrig et al. 1984 [194] Henderson 1985 [263]
A22	Payne River	e. Canada (61°N, 72°W)	2175-1790	SE	250	120			Fahrig et al. 1986 [193] Fahrig & West 1986 [197]
A23	Biscotasing [Preissac, Abitibi]	s. Canada (47°N, 82°W)	U 2167±2	NE	1100?	550			Buchan et al. 1993 [94] Buchan et al. 1994 [95]
A24	Cauchon [Molson]	c. Canada (55°N, 97°W)	P 2170-2120	NE	300	100			Zhai et al. 1994 [610]
A25	Marathon	s. Canada (49°N, 87°W)	U 2121+17/-7	N	300	200			Buchan et al. subm. [93]
A26	Fort Frances (Kenora- Kabetogama)	s. Canada (53°N, 94°W)	U 2076+5/-4	NW-NNW (fan)	300	250	35°	44°N, 91°W	Halls 1986 [237] Osmani 1991 [408] Chandler 1991 [118] Southwick & Day 1983 [501] a: Buchan et al. subm. [93] a: Wirth et al. 1995 [601]

A27	Kapuskasing (> 1 swarm?)	s. Canada (48.0°N, 83.0°W)	A ≥2043	ENE	120	40			Halls & Palmer 1990 [239] a: Hanes et al. 1994 [246]
A28	Hearne-1 (McKinley Point)	n. Canada (62.2°N, 112.4°W)	~2000	ENE	50	15			Henderson 1985 [263] Fahrig & West 1986 [197]
	?--Hearne-2	n. Canada (62.5°N, 110°W)	U 2037+3/-2	ENE					Pehrsson et al. 1993 [425]
A29	Lac de Gras²	n. Canada (64°N, 111°W)	U 2023-2030	10° (N-NNE)	300	100			LeCheminant 1994 [329] a: LeCheminant & van Breemen 1994 [332]
A30	Richmond Gulf	e. Canada (56.3°N, 76.4°W)	G ~2025	115° (90-115°), {30°}					Chandler 1988 [116] Chandler 1982 [115] a: Chandler & Parrish 1989 [117]
A31	Cherry Creek (Kennedy)	nw. USA (42°N, 106°W)	U 2010±10	NE-ENE?	200?	300?			Cox et al. 1995 [139] Snyder et al. 1989 [498] Summers et al. 1995 [520]
A32	Beechey (Bathurst) ['Northwest trending']	n. Canada (67°N, 107°W)	~2000	SSE	250	100			Fahrig & West 1986 [197] Frith 1982a,b [208], [209] Fraser 1963 [205]
A33	Minto	e. Canada (57°N, 75°W)	~2000	ESE	100	100			Buchan et al. in prep [96]
	Early E-W [AD1, Iggavik, Kuanitic]	sw. Greenland (61.5°N, 48.5°W)	2200-1900 > MD1	E-ESE					Berthelsen & Hendriksen 1975 [70] Higgins 1990 [266]
	MD1 [AD2, Iggavik, Kuanitic] ³	sw. Greenland (61.7°N, 48.8°W)	2200-1900 < Early E-W > MD2	N-NNW	250	50			Berthelsen & Hendriksen 1975 [70] Higgins 1990 [266] Hall & Hughes 1987 [234] Bridgewater et al. 1995 [92]
	MD2 [AD3, Iggavik, Kuanitic] ³	sw. Greenland (61.7°N, 48.8°W)	2200-1900 R 2180±100 < MD1 > MD3	NE	70	160			Berthelsen & Hendriksen 1975 [70] Higgins 1990 [266] Hall & Hughes 1987 [234] a: Kalsbeek & Taylor 1985 [301]
A34	MD3 [AD4, Iggavik, Kuanitic] ³	sw. Greenland (62.3°N, 49.5°W)	2200-1900 2100±85 < MD2	SE-E	200	220			Berthelsen & Hendriksen 1975 [70] Higgins 1990 [266] a: Kalsbeek & Taylor 1985 [301]

	PP (Plagioclase-Phyric) [MD3b]	sw. Greenland ~(63°N, 50°W)	2200-1900 < MD3	SE-E					Hall & Hughes 1990 [235]
A35	BN-1 (High Mg-1), (includes Pakitsoq, Feeder, West Sister, East Sister, Aornit and Isua dykes) ⁴	sw. Greenland (65°N, 51°W)	U 2214±10	NNW-NNE	450	120			Hall & Hughes 1987 [234] Bridgewater et al. 1995 [92] a: Nutman et al. 1995 [398]
	BN-2 (High Mg-2), (includes Kangeq and Eqaq dykes) ⁴	sw. Greenland (65.7°N, 51.6°W)	2200-1900	NE	120	120			Hall & Hughes 1987 [234] Bridgewater et al. 1995 [92]
A36	<u>Kangâmiut-1</u> (Kangâmiut-E)	sw. Greenland (66.4°N, 51.5°W)	2200-1900 > Kangâmiut NNE	E	180	40			Bridgewater et al. 1976 [91] Allart 1975 [20]
A37	<u>Kangâmiut-2</u> (Kangâmiut-NNE)	sw. Greenland (66.4°N, 52.0°W)	U 2046±8	NNE (in part deformed)	170	130			Escher et al. 1975 [184] Bridgewater et al. 1995 [92] a: Nutman in Bridgewater et al. 1995 [92]
A38	Metadolerites of E. Greenland	se. Greenland (62.5°N, 42°W)	2200-1900	variable					Nielsen 1987 [394]
A39	Umivik	se. Greenland (65°N, 40°W)	2100-1950	E		100			Nielsen 1987 [394]
	?-- Ammassalik	se. Greenland ~(66°N, 37°W)	>1885						Kalsbeek et al. 1993 [300]
A40	Charcot	se. Greenland (66.5°N, 35.5°W)	2600-1800	NE-E					Nielsen 1987 [394]
A41	Wabigoon	s. Canada (49°N, 91°W)	~1900	ESE	250	20			Dunlop 1983 [160] OGS 1991 [407] Osmani 1991 [408] a: Fahrig & West 1986 [197]
A42	Cuthbert [Molson]	c. Canada (55°N, 97°W)	U 1883±2	NE	300	100			Zhai et al. 1994 [610] a: Heaman et al. 1986 [260] Ermanovics & Fahrig 1975 [173]
A43	Avayalik	e. Canada (58.5°N, 63°W)	U 1834+7/-3	N, NE, SE					Van Kranendonk et al. 1993 [571] Van Kranendonk 1994b [570] Van Kranendonk & Wardle 1995a [574] Taylor 1975b [536] a: Scott 1995 [478]

	'Second set'	e. Canada (59.6°N, 64.2°W)	G <Avayalik	N?					Van Kranendonk et al. 1993 [571] Van Kranendonk & Wardle 1994 [573]
A44	Sparrow	c. Canada (61°N, 112°W)	U 1827±4	SE-ESE	400	250			McGlynn et al. 1974 [359] a: Bostock & van Breemen 1992 [88]
A45	North Channel	s. Canada (46.5°N, 83°W)	~1800	E-ESE	150	50			Fahrig & West 1986 [197]
A46	Cleaver	n. Canada (66°N, 118°W)	G 1723±60	SE	100	200			Wynne et al. 1995 [607] Hildebrand 1984 [268] Fahrig & West 1986 [197]
A47	Dease	n. Canada (67°N, 119°W)	~1700	SE	150	150			Fahrig & West 1986 [197] Ross & Kerans 1989 [467]
	<u>Little Grady Island</u>	e. Canada (53.7°N, 56.4°W)	~1700	E	6	10			Murthy et al. 1989b [379]
A48	Melville Bugt	wc. Greenland (73°N, 55°W)	R 1645±35	SE	1100	200			Nielsen 1990 [395] Escher 1980 [185] a: Kalsbeek & Taylor 1986 [302]
A49	Uranium City	c. Canada (59.6°N, 109.0°W)	K 1635±180	E	35	20			Evans & Bingham 1973 [187] Hale 1954a,b [232], [233]
	Otish	ce. Canada (52.3°N, 71°W)	K 1465 K 1591 K 1718	irregular, mainly NE & {SE}	105	80			Chown & Archambault 1987 [122] Fahrig & Chown 1973 [192]
A50	Silver Mines (St. Francois Mtn.)	s. USA (37.6°N, 90.5°W)	~1480	mainly 50°					Sylvester & Schulz 1985 [531]
A51	Skrainka (St. Francois Mtn.)	s. USA (37.6°N, 90.5°W)	A ≥1240 G < Silver Mines	30°, {150°}					Sylvester & Schulz 1985 [531] a: Honda et al. 1985 [273]
A52	<u>Wyoming Block-1</u> ⁵	nw. USA (43°N, 109°W)	U ~1460	ESE-SE	800	150			Chamberlain & Frost 1995 [114] Harlan 1993 [250] Snyder et al. 1989 [498] Wooden et al. 1978 [604]
A53	Indian Harbour (Michael Gabbro)	e. Canada (54.4°N, 57.1°W)	G 1426±6	E					Murthy & Deutsch 1972 [382] a: Murthy et al. 1989 [379]

A54	Mealy [Lake Melville]	e. Canada (53°N, 59°W)	R 1380±54	ENE	100	50			Emslie et al. 1984 [169] Park et al. 1988 [416] Gower et al. 1990 [221] Hill & Miller 1990 [269]
	?--Cape Caribou River	e. Canada (53.5°N, 60.5°W)	G <1620 G >1008	~NE					Wardle et al. 1990 [586]
A55	Korok dyke & sheets	e. Canada (58°N, 65°W)	~1350	SSE					Fahrig 1986 [190]
	Akkuneq (4 swarms?)	e. Canada (56.7°N, 61.2°W)	>1300?	deformed					Cadman & Ryan 1994 [103] Cadman et al. 1993a [101]
A56	Midsommersø (Zig-Zag Dal)	n. Greenland (82°N, 34°W)	P ~1300	NE					Bengaard & Henriksen 1986 [55] a: Marcussen & Abrahamsen 1983 [353]
A57	<u>Th. Pedersen Land</u>	n. Greenland (81.5°N, 45°W)	P ~1300	E					Abrahamsen & Van der Voo 1987 [43] Henriksen 1989 [265]
A58	Schefferville	e. Canada (54.5°N, 67°W)	~1300	N	60	10			Fahrig 1976 [189]
A59	<u>Nain-1</u> (LP)	e. Canada (56.5°N, 61.5°W)	G ~Harp	E-ENE	70	60			Wiebe 1985 [593] Gower et al. 1990 [221] Hill & Miller 1990 [269] a: Cadman et al. 1993b [102]
A60	Harp [Shapio]	e. Canada (55°N, 61°W)	~1270	NE-ENE, N-NE	200	125			Wiebe 1985 [593] Wardle 1993 [585] Meyers & Emslie 1977 [365] Irving et al. 1977 [282] Gower et al. 1990 [221] Hill & Miller 1990 [269] a: Cadman et al. 1993b [102]
	--Harp CO			N-NE					Cadman et al. 1993b [102]
	--Harp UT		U 1273±1	NE-ENE					Cadman et al. 1993b [102]
	--Harp PT			NE-ENE					Cadman et al. 1993b [102]
A61	<u>Nain-2</u> (HP)	e. Canada (56.5°N, 61.5°W)	R 1276±23	NNW-NNE	100	30			Wiebe 1985 [593] Gower et al. 1990 [221] Hill & Miller 1990 [269] a: Carlson et al. 1993 [110]

	Nutak	e. Canada (57.5°N, 61.9°W)	U ~1268	various					Ermanovics & Van Kranendonk 1995c [176] a: C. Roddick in Cadman et al. 1993 [102]
A62	Gardar (various swarms)	s. Greenland (61°N, 46°W)	1300-1150	NE-E	300				Nielsen 1987 [394] Kalsbeek & Taylor 1985 [301] a: Paslick et al. 1993 [420]
	-- Gardar BFD (Big Feldspar Dyke)	sw. Greenland (61.3°N, 48.2°W)	1300-1240 > BD0 & < BD0 > BD1	ENE-NE	40	70			Berthelsen & Hendriksen 1975 [70]
	-- Gardar BD0 (Brown Dyke 0)	sw. Greenland (61.2°N, 48.2°W)	U ~1280 > BD1	ESE-ENE	180	80			Berthelsen & Hendriksen 1975 [70] a: Heaman & Upton in Cadman et al. 1993 [102]
	-- Gardar BD1 (Brown Dyke 1, ?Nunarssuit-Isortoq)	sw. Greenland (61.2°N, 48.2°W)	1300-1240 < BD0 > BD2	ENE	60	80			Berthelsen & Hendriksen 1975 [70]
	-- Gardar BD2 (Brown Dyke 2, ?Nunarssuit-Isortoq)	sw. Greenland (61.2°N, 48.2°W)	1170-1150 < BD1	NE	60	70			Berthelsen & Hendriksen 1975 [70] Piper 1995 [437]
	-- Giant dykes	sw. Greenland (60.7°N, 46.3°W)	1170-1150 R ≤1154±9 > BD3	NE	170	60			Piper 1995 [437] MacDonald & Upton 1993 [342] a: Blaxland et al. 1978 [82]
	-- Gardar BD3 (Brown Dyke 3, ?Nunarssuit-Isortoq)	sw. Greenland (60.7°N, 46.3°W)	1170-1150 R ≤1154±9	NE	100	15			Piper 1995 [437] a: Blaxland et al. 1978 [82]
A63	-- Gardar of E. Greenland	se. Greenland (62°N, 42.3°W)	1300-1150	E	20	90			Nielsen 1987 [394] Allaart 1975 [20]
A64	Mackenzie	n. Canada (65°N, 110°W)	U 1267±2	S-ESE (fan)	2300 (2600)	1300	100°	71°N, 116°W	Fabrig 1987 [191] a: LeCheminant & Heaman 1989 [330]
	-- '305'	n. Canada (65°N, 111°W)	P ~1250	SE	50				Kjarsgaard & Wyllie 1993 [310] LeCheminant 1994 [329] a: K.L. Buchan in LeCheminant 1994 [329]
A65	Sudbury	s. Canada (47°N, 82°W)	U 1235+7/-3	SE	300	300		SE of swarm	Palmer et al 1977 [412] Bethune 1993 [73] Ernst 1994 [178] a: Dudàs et al. 1994 [157] a: Krogh et al. 1987 [316]

	Tudor (Turriff) (> 1 swarm?)	s. Canada (44.8°N 78.0°W)	1300-1100	deformed	50				Smith & Holm 1990a,b [494],[495]
	Parry Island	s. Canada (45.3°N, 80.2°W)	U,G <1160±3 >1151±2	variable					Wodicka 1994 [602] Wodicka et al. 1996 [603]
A66	Kingston	s. Canada (44.3°N, 76.2°W)	U ~1160	SSE	25	25			Reynolds et al. 1978 [463] Park & Irving 1972 [415] Fahrig & West 1986 [197] a: Perhsson & Kamo in Easton & Davidson 1994 [164]
A67	Abitibi	s. Canada (48°N, 82°W)	U 1141±1	NE-ENE (fan)	700	500	25°	48°N, 88°W	Ernst & Buchan 1993 [180] Ernst & Bell 1992 [179] Ernst et al. 1995 [183] a: Krogh et al. 1987 [316]
A68	Eye Dashwa	s. Canada (49.0°N, 91.7°W)	K 1132±27 K 1143±27	ESE	70	10			Osmani 1991 [408] OGS 1991 [407] a: Hunt & Roddick 1987 [277]
A69	Aillik	e. Canada (55°N, 60°W)	~1100	ENE	12	5			Fahrig & Larochelle 1972 [196] Malpas et al. 1986 [350] Taylor 1975d [538]
A70- A73	Keweenawan								Fahrig 1987 [191] Green et al. 1987 [225] Pesonen & Halls 1979 [430]
A70	--Baraga (Marquette)	n. USA (46.5°N, 88°W)	G 1107-1098	E-ENE	300	200			Fahrig 1987 [191] Green et al. 1987 [225] Pesonen & Halls 1979 [430]
A71	--Central Wisconsin	n. USA (45°N, 90°W)	~1100	ENE	250	120			Green et al. 1987 [225] King 1990 [309]
	--Mellen Gogebic	n. USA (45.6°N, 91°W)	~1100	ENE	70	80			Green et al. 1987 [225] King 1990 [309]
A72	--Thunder Bay (Pigeon River, Grand Portage)	s. Canada, n. USA (48°N, 89°W)	~1100 G 1107-1098? A 1135	NE-ENE	150	30			Green et al. 1987 [225] Pesonen 1979 [428] a: Hanson 1975 [247]
	--Arrow River	s. Canada (48.3°N, 89.5°W)	G ≤1100 <Pigeon River	SE	15				Smith & Sutcliffe 1989 [493]

	--Ely-Moose Lake	s. Canada, n. USA (48°N, 92°W)	~1100	ENE					Green et al. 1987 [225]
	--Carlton County	n. USA (46.5°N, 93.0°W)	1200-1100	NNE					Green et al. 1987 [225]
A73	--Pukaskwa [Gargantua]	s. Canada (48.1°N, 85.8°W)	G ~1100	SE	100	30			Green et al. 1987 [225] Osmani 1991 [408] C.J. Hale in Halls & Pesonen 1982 [240]
A74	<u>Hualapai</u> (Southwest USA)	sw. USA (34°N, 113.5°W)	U ~1100-1080	SE	800	450			Conway & Gonzales 1995 [133] Hammond 1990 [245]
A75	Hottah sheets	n. Canada (65°N, 118°W)	U 779±2	NE	150 (1900)	200			Park et al. 1995a [413] a: LeCheminant & Heaman 1994 [331]
A76	Mackenzie Mountains	nw. Canada (65°N, 129°W)	U 779±2	N	100 (1600)	650			Park et al. 1995b [414] a: LeCheminant & Heaman 1994 [331]
A77	<u>Wyoming Block-2⁶</u>	nw. USA (45°N, 112°W)	A 769±7 U 785±8 U 782±8	ESE	400 (1600)	250			Park et al. 1995b [414] Harlan 1993 [250] a: S.S. Harlan & W. Premo in Park et al. 1995 [414]
A78	Hottah (dykes)	n. Canada (67°N, 118°W)	~750	N-NE	300	120			Fahrig & West 1986 [197] Ross & Kerans 1989 [467]
A79	Aston	n. Canada (73.6°N, 95.0°W)	~750	NE	15	35			Jones & Fahrig 1978 [296] Stewart 1987 [514] a: Fahrig & West 1986 [197]
A80	Baffin Island-2	n. Canada (73°N, 82°W)	~750	N-NNW	100	100			Fahrig & West 1986 [197]
A81	Franklin [Borden]	n. Canada (70°N, 75°W)	U 723+4/-2	E-S (fan)	1200	900	~90°	75°N, 120°W	Ernst & Buchan subm. [181] Fahrig 1987 [191] Baragar & Donaldson 1973 [41] Jefferson et al. 1994 [292] a: Heaman et al. 1992 [259] Cook & Aitken 1969 [134] Frisch 1984, 1988 [206],[207] Perhsson & Buchan 1994 [424]
A82	Thule	nw. Greenland (77°N, 70°W)	K ~730-640	ESE	300	200			Nielsen 1987 [394] Dawes 1991 [144] a: Dawes & Rex 1986 [145]

A83	Long Range [Trunmore Bay] (PRT)	e. Canada (50.5°N, 56.5°W) (53.5°N, 57.0°W)	U 615±2	NE	350 (1200)	300			Murthy et al. 1992 [378] a: Kamo et al. 1989 [303]
A84	Grenville	s. Canada (46°N, 77°W)	U 590+2/-1	ESE	700 (900)	200		45°N, 71°W	St. Seymour & Kumarapeli 1995 [509] Kretz et al. 1985 [313] a: Kamo et al. 1995 [304]
	Rideau	s. Canada (44.4°N, 76.0°W)	~575	NE	10	20			Park & Irving 1972 [415] a: Fahrig & West 1986 [197]
A85	Adirondack	ne. USA (44°N, 74°W)	A 588-542	E-NNE	150	100			St. Seymour & Kumarapeli 1995 [509] Goldberg & Butler 1990 [216] a: Isachsen et al. 1988 [284]
A86- A91	Southern PRT (Late Proterozoic rift-related tholeiitic)	e. USA	900-550		700 (1200)				Goldberg & Butler 1990 [216]
A86	--Hudson Highlands	e. USA (41.3°N, 73.8°W)	900-550	NE					Goldberg & Butler 1990 [216]
A87	--Reading Prong	e. USA (40.8°N, 75.0°W)	900-550	NE					Goldberg & Butler 1990 [216]
A88	--Avondale	e. USA (40.0°N, 75.5°W)	900-550	NE					Goldberg & Butler 1990 [216]
A89	--Honeybrook	e. USA (40.1°N, 75.8°W)	900-550	NE-E					Goldberg & Butler 1990 [216]
A90	--Skyline	e. USA (38.8°N, 78.2°W)	900-550	NNE					Goldberg & Butler 1990 [216]
A91	--Bakersville (?Linville)	e. USA (36.2°N, 82.1°W)	R 734±26	NE, {SE}					Goldberg & Butler 1990 [216] a: Goldberg et al. 1986 [217] a: Fetter & Golberg 1995 [201]
A92	<u>Burwell</u>	e. Canada (59.5°N, 64.5°W)	524±78	~80°	50	70			Van Kranendonk & Wardle 1994, 1995a,b [573], [574], [575] Van Kranendonk 1994a,b [569], [570] a: Taylor 1979 [539]
A93	<u>Placentia Bay</u>	e Canada (46.9°N, 54.1°W)	G 510-350	120° (90-140°)	25	30			Greenough 1984 [226]

A94	<u>Gunnison</u>	wc. USA (38.4°N, 106.7°W)	R 497±16	ESE	80	30			Larson et al. 1985 [326]
	<u>Cape Ann</u> <u>(Avalon Boston</u> <u>terrane-1)</u>	ne. USA (42.5°N, 70.8°W)	K 380-250	SE					Ross 1990a,b [459], [470] a: Ross 1985 [468]
	<u>Salem (Avalon</u> <u>Boston terrane-</u> <u>2)</u>	ne. USA (42.5°N, 71.1°W)	K 320-250	E					Ross 1990a,b [469], [470] McHone et al. 1987 [361] a: Ross 1985 [468]
A95	<u>Bonavista Bay</u> (Deadman's Bay)	e. Canada (49.1°N, 53.8°W)	A 370±10	N	40	30			Murthy 1983a,b [380], [381] Jayasinghe 1978 [291]
A96	<u>Sandwich Bay</u>	e. Canada (53.6°N, 57.4°W)	K 327±13	ESE	15	4			Murthy et al. 1989a [377]
A97	<u>Gaspé</u>	e. Canada (48.8°N, 64.5°W)	K ~310	ESE-ENE	25	15			Seguin 1987 [479] Murthy et al. 1989a [377]
A98	<u>CNE (Coastal</u> <u>New England)</u>	ne. USA (42.9°N, 70.8°W)	K 237-212	NE	5				McHone et al. 1987 [361] a: Bellini et al. 1982 [54]
	<u>?--Boston</u> <u>(Avalon Boston</u> <u>terrane-3)</u>	ne. USA (42.5°N, 70.9°W)	~200	NE					Ross 1990a,b [469],[470] Ross 1992 [471] McHone et al. 1987 [361]
A99	<u>ENA (Eastern</u> <u>North America)</u>	e. USA & e. Canada (37°N, 78°W)	U 200±2	NW-NE (fan)	2000 (2800)	300	90°	31°N, 78°W	McHone et al. 1987 [361] Greenough & Hodych 1990 [227] a: Dunning & Hodych 1990 [161] Oliveira et al. 1990 [406]
A100	<u>--Charleston⁷</u>	e. USA (37°N, 80°W)	~200 (< ENA)	N	400	100			Ragland et al. 1983 [451] Smith 1987 [496]
	<u>Boston</u> <u>Platform-4</u>	ne. USA (42.5°N, 71.0°W)	~200	N & NE					McHone et al. 1987 [361]
A101	<u>Trap (TD, Coast</u> <u>Parallel)</u>	sw. Greenland (61°N, 48°W)	K 225-116	SE	1000	50			Nielsen 1987 [394] Fabrìg & Freda 1975 [195] Fabrìg 1987 [191] Piper 1995 [437]
A102	<u>Anticosti Island</u>	e. Canada (50°N, 63°W)	K 178±8	SE					Bédard 1992 [50]

A103	<u>Hazen Strait</u>	n. Canada (76°N, 108°W)	K ~120	NE	530	200			Balkwill & Fox 1982 [39] Tozer & Thorsteinsson 1964 [557] Stott 1968 [519] Balkwill 1979 [38] a: Balkwill & Haimila 1978 [40]
A104	<u>Lightfoot River</u>	n. Canada (80.5°N, 90°W)	G 145-65	N-NNW	480	270			Williamson 1988 [595] Thorsteinsson 1971a,b,d,e [546], [548], [549], [545], Thorsteinsson & Trettin 1972b,c,d [551],[552], [553] Thorsteinsson 1972 [550] Kerr & Thorsteinsson 1972 [308]
A105	<u>Surprise Fiord</u>	n. Canada (78°N, 91°W)	G 145-65	E	380	220			Jollimore 1986 [294] Thorsteinsson 1971c [547] Thorsteinsson 1970 [544] Balkwill 1979 [38]
A106	<u>Nansen Land</u>	n. Greenland (83.5°N, 40°W)	G ~70	N	50	250			Soper et al. 1982 [500] Nielsen 1987 [394] Henriksen 1989 [265] Bengaard & Henriksen 1986 [55]
A107	<u>Erlandsen Land</u>	n. Greenland (82.5°N, 36°W)	G ~70	SE	70	60			Soper et al. 1982 [500] Nielsen 1987 [394] Bengaard & Henriksen 1986 [55]
A108	<u>J.P. Koch Fjord</u>	n. Greenland (83.0°N, 42°W)	G ~70 K ~66	E	120	50			Soper et al. 1982 [500] Nielsen 1987 [394] Henriksen 1989 [265] a: Dawes & Sopher 1971 [146]
A109	<u>East Greenland Tertiary</u>	e. Greenland (68°N, 32°W)	60-30	NE	800	200			Nielsen 1987 [394]
	--Werner Bjerger (T1)	e. Greenland (72.3°N, 24°W)	≥28	N-NE					Nielsen 1987 [394]
	--'Late' (T2)	e. Greenland (68°N, 32°W)	ca. 50-30	ENE?					Nielsen 1987 [394]
	--Scoresby Sund (T3)	e. Greenland (71°N, 23°W)	ca. 50-30	ENE-ESE	250	80			Nielsen 1987 [394]
	--Hold with Hope (T4)	e. Greenland (73.5°N, 21°W)	ca. 50	NE	80				Nielsen 1987 [394]
	--Blosseville Coast (T5)	e. Greenland (69°N, 25°W)	ca. 52	NE	150				Nielsen 1987 [394]

	--Coast Parallel (T6)	e. Greenland (67°N, 34°W)	ca. 50-30	E, {NE}	200				Nielsen 1987 [394] Meyers 1980 [385]
	--Wiedemann Fjord (T7)	e. Greenland (68.5°N, 30°W)	ca. 47	E-NE					Nielsen 1987 [394] Meyers 1980 [385]
	--Supertoq (T7)	e. Greenland (65.6°N, 38.5°W)	50?	NE					Nielsen 1987 [394]
A110	'No name' (T8)	w. Greenland (71°N, 54°W)	ca. 60-35	SE	200	50			Nielsen 1987 [394]
A111	Chief Joseph (Grande Ronde + Cornucopia)	nw. USA (46°N, 117°W)	17-14	155-180°	300 (600)	230			Tolan et al. 1989 [554] Atkinson & Lambert 1990 [32] Hooper 1988 [274]
A112	Monument Valley	nw. USA (45°N, 119.5°W)	16.5-14.5	145°	140 (470)	60			Tolan et al. 1989 [554] Hooper 1988 [274]
A113	<u>Cascade Range</u>	nw. USA (44.7°N, 122.3°W)	17-10	135°	70 (560)	80			Walker & MacLeod 1991 [583]
A114	Steens Mountain	nw. USA (42.6°N, 118.6°W)	~15	16°	30?				Walker & MacLeod 1991 [583] Carlson & Hart 1988 [109]
A115	Nevada rift	w. USA (41°N, 117°W)	16.5-15.5	161°	50? (220)				Zoback et al. 1994 [616]
A116	Queen Charlotte Island (6 swarms)	w. Canada (52.5°N, 131.5°W)	55-13	NNW-E	100	30			Irving et al. 1992 [283]
A117	<u>Bella Bella</u>	w. Canada (52°N, 128°W)	K 12.5±2.7	N					Symons et al. 1980 [532] a: Wanless et al. 1970 [584]
VERY POORLY DATED SWARMS									
A118	Inukjuak	c. Canada (58°N, 77°W)		SE	20	2			Legault et al. 1994 [335] P. Budkewitsch (pers. comm. 1995)
A119	<u>James Bay</u> (part of Biscotasing or Abitibi) [Preissac]	s. Canada (51.5°N, 77°W)	2170 or 1140	NE	600	300			Fahrig & West 1986 [197]
	Lac Pommeroy	s. Canada (47.3°N, 79°W)	? ~575	SE	150	50			Fahrig & West 1986 [197]

A120	Nipigon (part of Marathon or Keweenawan)	c. Canada (50°N, 88°W)	2121 or 1100	N	250	100			Osmani 1991 [408] Ernst & Buchan subm. [181]
A121	North Caribou (part of Cauchon or Cuthbert)	c. Canada (53°N, 91°W)	~2150 or 1883	NE-NNE	300	150			Osmani 1991 [408]
	--'N-trending'	c. Canada (52.5°N, 93.5°W)		N	150	100			Osmani 1991 [408] Stone 1989 [517]
	West Channel	n. Canada (66.4°N, 117.7°W)	? ~1400	~30	25	6			Irving et al. 1972 [281] Feniak 1952 [198] Hildebrand 1982 [267]

Notes

¹Fahrig & West (1986) [197] consulted for the geometry of most swarms of the Canadian Shield.

²**Lac de Gras:** The Lac de Gras swarm converges slightly to the north (LeCheminant 1994 [329]).

³**MD:** MD stands for metadolerite.

⁴**BN-1, BN-2** = Boninitic-Noritic (Hall & Hughes 1987 [234]).

⁵**Wyoming Block-1:** The 1450 Ma dykes of the **Wyoming Block-1** swarm are found in the Tobacco Root Mtns., Beartooth Mtns., Wind River Mtns., Granite Mtns., Hartville Uplift and perhaps in the Colorado Front (Snyder et al. 1989 [498]).

⁶**Wyoming Block-2:** 780 Ma dykes of the **Wyoming Block-2** swarm are found in the Beartooth Mtns., Tobacco Root Mtns. and Tetons (Snyder et al. 1989 [498]; Harlan 1993 [250])

⁷**Charleston:** The Charleston swarm converges slightly to the south.

Map Label	Swarm Name	Location	Age (Ma)	Trend	Length (km)	Width (km)	Fan Angle	Focus or Source Direction	Selected References
<u>SOUTH AMERICA</u>									
B1	Gioás-1	Brazil (15°S, 50°W)	G >2500, prob. >2900	SE	100	100			Tassinari and Montalvão 1980 [534] Kuyumjian 1991 [321] Oliveira 1989 [403]
B2	Lavras-1	Brazil (21°S, 45°W)	S 2833±65 G 2000-1300	145° (130-170°)	200	250			Pinese et al. 1995a,b [435], [436] Quéméneur 1991 [445] Sial et al. 1987 [489]
B3	Uauá-1	Brazil (10.2°S, 39.3°W)	S ~3033 R >2380±114 G > Uauá-2	SE					Correa Gomes & Tanner de Oliveira 1994 [136] Correa Gomes et al. 1994 [137] a: E. Oliveira (pers. comm. 1995) a: Bastos Leal et al. 1994 [46] Oliveira & Souza 1995 [404] Oliveira 1989 [403]
	Uauá-2	Brazil (9.8°S, 39.5°W)	S ~2977 R 1983±31 G < Uauá-1	N-NE	30	80		source to S-SW	Correa Gomes & Tanner de Oliveira 1994 [136] a: E. Oliveira (pers. comm. 1995) a: Bastos Leal et al. 1994 [46] Bastos Leal & Menezes 1991 [45] Oliveira & Souza 1995 [404] Oliveira 1989 [403]
	<u>Bonfirm Complex-1</u>	Brazil (20.2°S, 44.1°W)	>2500						Carneiro 1991 [112]
B4	<u>Pintadas</u>	Brazil (11.8°S, 40.0°W)	~2200	N	90	50		source to S	Correa Gomes & Tanner de Oliveira 1994 [136] Correa Gomes et al. 1994 [137]
B5	<u>Juazeiro</u>	Brazil (9.8°S, 40.8°W)	>2200	N	20	30		source to S	Correa Gomes & Tanner de Oliveira 1994 [136] Correa Gomes et al. 1994 [137]

B6	Aroeira	Brazil (12°S, 40°W)	2200-1800	NE					Sial et al. 1987 [489] Oliveira 1989 [403]
B7	Virginópolis	Brazil (19°S, 43°W)	R ~2200	variable					Sial et al. 1987 [489] a: Siga Jr 1982 [490]
B8	Lavras-2	Brazil ~(21.7°S, 45°W)	S 1909±50	20° (20-60°), {~0°}, {~90°}					a: Pinese et al. 1995a,b [435], [436] Quéméneur 1991 [445]
B9	Rio Aro (Avanavero suite)	Venezuela (7°N, 64°W)	1840-1800	SE	150	100			Gibbs 1987 [212] Choudhuri et al. 1990 [121] Gibbs & Barron 1993 (ch. 9) [213]
B10	Guaniamo (Avanavero suite)	Venezuela (7°N, 66°W)	1840-1800	NE	100	100			Gibbs 1987 [212] Choudhuri et al. 1990 [121] Gibbs & Barron 1993 (ch. 9) [213]
B11	<u>Majoli</u> (Avanavero suite)	Brazil, Surinam, Guyana, Venezuela (4°N, 56°W)	1840-1610	NE	200	250			Choudhuri et al. 1990 [121] Gibbs 1987 [212] Gibbs & Barron 1993 (ch. 9) [213]
	-- <u>Western Suriname</u>	Suriname ~(4°N, 56°W)	K ~1640 K ~1540	NE	350	250			Sial et al. 1987 [489]
	-- <u>Supenaan</u> (Avanavero suite), (cf. Supenaam)	Guyana (6°N, 60°W)	G 1800-1500	NE	250	200			Sial et al. 1987 [489] Gibbs 1987 [212]
B12	Kayser (Avanavero suite)	Surinam (3°N, 57°W)	1800-1600	SSE					Gibbs 1987 [212]
B13	Pedra Preta (Roraima)	Brazil ~(4°N, 60°W)	1850-1600	ESE-E	100				Teixeira 1990 [540][397]
B14	<u>Sao Joao del Rei</u>	Brazil ~(21°S, 44°W)	> Tiradentes	~ENE					Noce & Karfunkel 1991 [397]
B15	<u>Tiradentes</u>	Brazil ~(21°S, 44°W)	G <1900 (250-65)?	N-NW	20	30			Noce & Karfunkel 1991 [397]
B16	Florida (Uruguayan)	Uruguay (33°S, 56.3°W)	A 1728±2	60° (60-80°)	220	100			Bossi et al. 1989 [87] Bossi et al. 1991 [86] Rivalenti et al. 1991 [465] a: Teixeira et al. 1995 [541]

B17	Quatro Marcos-1 & -2	Brazil (15.6°S, 58.2°W)	>~1500						Carneiro 1989 [111]
B18	Serro do Cachimbo-1	Brazil (9°S, 56°W)	K ~1330	SE	450	200			Sial et al. 1987 [489] Lima & Bezerra 1991 [336]
B19	Serro do Cachimbo-2	Brazil (9°S, 56°W)	K ~1330	NE	400	400			Sial et al. 1987 [489] Lima & Bezerra 1991 [336]
B20	Tapajós	Brazil (4°S, 56°W)	1600-900	~40°	350	100			Teixeira 1990 [540]
B21	Araras	Brazil (9°S, 64°W)	1500-900	~130°	400	200			Teixeira 1990 [540]
B22	Cachorro	Brazil (1°S, 58°W)	1600-900	~70°	600	100			Teixeira 1990 [540]
B23	<u>Beneficente</u> (several swarms)	Brazil (6°S, 62°W)	1600-900	NE, NW					Teixeira 1990 [540] Iwanuch et al. 1991 [288] Iwanuch 1981 [287]
B24	Ibitiara-Ibiajara (Espinhaço)	Brazil (13.5°S, 41.5°W)	1200-900	SE	450	200			Correa Gomes & Tanner de Oliveira 1994 [136] Correa Gomes et al. 1994 [137] Sial et al. 1987 [489]
B25	Quarenta Ilhas	Brazil ~1°S, 60°W)	R ~1130 >1420	variable					Sial et al. 1987 [489] Teixeira 1990 [540]
B26	Ilhéus-Olivença-Camacã	Brazil (14.8°S, 39°W)	A ~1012 A ~1077	90°	100	70		source to E	Correa Gomes 1995 [135] Correa Gomes & Tanner de Oliveira 1994 [136] Correa Gomes et al. 1994 [137] Bellieni et al. 1991a,b [52], [53] Tanner de Oliveira et al. 1989 [533] a: Renne et al. 1990 [462] a: D'Agrella et al. 1990 [142]
B27	Itacaré	Brazil (14.3°S, 39°W)	~Salvador	120°				source to SE	Correa Gomes 1995 [135] Correa Gomes et al. 1994 [137] Correa Gomes & Tanner de Oliveira 1994 [136]

B28	Salvador	Brazil (13.0°S, 38.5°W)	U ~924 A 1021±8	160° (140-160°)	10	10		source to S	Correa Gomes 1995 [135] Correa Gomes & Tanner de Oliveira 1994 [136] Correa Gomes et al. 1994 [137] Moraes-Brito et al. 1989 [370] a: Heaman 1991 [256] a: D'Agrella-Filho et al. 1989 [140]
B29	Jacobina	Brazil (11.2°S, 40.5°W)	~1080	E	5	25		source to W	Correa Gomes & Tanner de Oliveira 1994 [136] Correa Gomes et al. 1994 [137]
B30	Pará de Minas	Brazil (20°S, 45°W)	P ~1000	SE, {NE}	100	100			D'Agrella-Filho & Pacca 1991 [141] Sial et al. 1987 [489] Oliveira 1991 [150] Oliveira 1991 [150]
B31	<u>Paramirim</u> (Espinhaço)	Brazil (13°S, 42°W)	700-500	SE					Correa Gomes & Tanner de Oliveira 1994 [136] Correa Gomes et al. 1994 [137] Sial et al. 1987 [489]
B32	Curaçá	Brazil (9.5°S, 40.0°W)	700-600	NE	100	60		source to SW	Oliveira 1991 [150] Correa Gomes & Tanner de Oliveira 1994 [136] Correa Gomes et al. 1994 [137] Oliveira & Tarney 1991 [405] Oliveira 1989 [403]
B33	<u>Tabuna</u>	Brazil (14.7°S, 39.3°W)	650-450	NE-ENE	70	20		source to SW	Correa Gomes & Tanner de Oliveira 1994 [136] Correa Gomes et al. 1994 [137]
B34	Nico Perez	Uruguay ? (33°S, 55°W)	~600	SE, {E}					Rivalenti et al. 1991 [465]
B35	Treinta y Tres	Uruguay ~(33.2°S, 54.3°W)	~600	NNE					Rivalenti et al. 1991 [465]
	PAPA (post- Avanavero and pre-Apatoe, Arakwai)	Guyana ~(3°N, 59.5°W)	1215-450	NE-ENE					Gibbs & Barron 1993 (ch. 9) [213] Berrangé 1977 [69]
B36	?--Rupununi	Guyana (3°N, 59°W)	G 400-350	NE	80	20			Sial et al. 1987 [489]

B37	?-- Taiano-Uraricoera-1	Brazil (3°N, 62°W)	K ~360	NE	200	50			Sial et al. 1987 [489]
B38	Apatoe (Eastern Suriname)	Suriname (3°N, 55°W)	~230	N-NNW	300	200			Sial et al. 1987 [489] Gibbs & Barron 1993 [213] Gibbs 1987 [212] a: Priem et al. 1973 [443] a: Bosma et al. 1984 [85]
	-- Apatoe-2 (*Younger Dyke Suite')	Guyana (3°N, 59.5°W)	~230	NE					Gibbs & Barron 1993 [213]
B39	Amapa (Cassiporé, Cayenne)	n. Brazil, French Guiana (2°N, 52°W)	~200	N-NW	400	150			Gibbs 1987 [212] Oliveira et al. 1990 [406] Sial et al. 1987 [489] Lima & Bezerra 1991 [336] Oliveira 1989 [403]
B40	-- Jari	n. Brazil (0°N, 52°W)	~ Amapa	NNE-NNW	200	50			Oliveira et al. 1990 [406] Lima & Bezerra 1991 [336] Oliveira 1989 [403]
B41	Cerro Bolivar	Venezuela ~(7.5°N, 63.5°W)	~200	ENE					MacDonald and Opdyke 1974 [344] Gibbs 1987 [212]
B42	Supenaam (cf. Supenaan)	Guyana (6°N, 59°W)	~200	NE	200	30			Gibbs 1987 [212]
B43	Formoso do Araguaia	Brazil ~(10°S, 50°W)	<250						Almeida & Carneiro 1991 [149]
B44	Alto Tapajós (Serra do Cachimbo-3)	Brazil (7°S, 61°W)	K 222-175	NE, SE, {N}	400	400			Sial et al. 1987 [489] Lima & Bezerra 1991 [336] Almeida & Carneiro 1991 [149]
B45	Rio Trombetas (+?Paru de Este- Monte Alegre)	Brazil (2°N, 57°W)	K ~200	N-NNE	500	100			Lima & Bezerra 1991 [336] Sial et al. 1987 [489] Almeida & Carneiro 1991 [149]
B46	Tukutu River (Berbice) [Minor dyke suite, Taiano- Uraricoera-2]	Guyana, Brazil (4°N, 59°W)	~200 (150-130)?	NE-ENE	500	300			Lima & Bezerra 1991 [336] Gibbs 1987 [212] Hargraves 1978 [248] Sial et al. 1987 [489] Choudhuri et al. 1991 [120]

	?--Apoteri Suite	Guyana, Brazil ~(3°N, 60°W)	178-114	E-NE					Gibbs & Barron 1993 (ch. 9) [213]
	?--Taiano- Uraricoera-2	Brazil (4°N, 60.5°W)	K 150-130	NE, N	200	50			Sial et al. 1987 [489] Lima & Bezerra 1991 [336] Gibbs & Barron 1993 (ch. 9) [213]
B47	Óbidos-Mapuera (Êbidos-Mapuera)	Brazil (2°S, 55°W)	K 180-130	N-NE, {SE}	300	400			Lima & Bezerra 1991 [336] Sial et al. 1987 [489]
B48	Vitoria- Ecoporanga	Brazil (19°S, 40°W)	K ~170	SE	100	50			Sial et al. 1987 [489]
B49	Maranhao-1	Brazil (7°S, 44°W)	K 190-115	NE	600	200			Sial et al. 1987 [489] Sial et al. 1989 [487]
B50	Maranhao-2	Brazil (6°S, 42°W)	K 190-115	SE	200	600			Sial et al. 1987 [489] Sial et al. 1989 [487]
B51	Itaituba- Altamira (Penatecaua)	Brazil (3°S, 54°W)	K 180-130	~N	50	300			Issler et al 1974 [286] Gibbs 1987 [212] Sial et al. 1987 [489] Lima & Bezerra 1991 [336]
B52	Jauaperi River	Brazil (1°S, 61.5°W)	250-65	NNE	250				Lima & Bezerra 1991 [336]
B53	Ceará-Mirim (Rio Grande do Norte, Mecejana- Fernando de Noronha)	Brazil (5°S, 37°W)	K, P 175-160 & 145-125	E	200	100			Bellieni et al. 1992 [51] Ernesto et al. 1991 [177] Sial et al. 1987 [489] Sial et al. 1989 [487] Martins et al. 1989 [355] Almeida & Carneiro 1989 [149]
B54	Paraguay	Paraguay (25°S, 56°W)	~130	SE	350	350			Druecker & Gay [155] Comin-Chiaramonti et al. 1991 [130] Comin-Chiaramonti et al. 1995 [129]
B55	--West Bodoquena	Brazil (22°S, 57°W)	G ~120	ESE-SSE	50	100			Sial et al. 1987 [489]
B56	Ponta Grossa ¹	Brazil (25°S, 50°W)	~130	SE	400	300		SE of swarm	Raposo & Ernesto 1995 [455] Sial et al. 1987 [489] Piccirillo et al. 1989 [432] Ferreira et al. 1989 [200] Pinese et al. 1991 [434]

B57	Santos-Rio de Janeiro	se. Brazil (23°S, 45°W)	~130	ENE	250	100			Turner et al. 1994 [560] Sial et al. 1987 [489] Comin-Chiaramonti et al. 1983 [131] Coutinho et al. 1991 [138]
B58	Florianópolis	se. Brazil (28°S, 49°W)	~130	NNE					Benini 1991 [56] Piccirillo et al. 1991 [433] P. Comin-Chiaramonti (pers. comm. 1995) Sial et al. 1985 (fig. 1) [488]
B59	Parecis	Brazil (13°S, 61°W)	K 150-110	NE, SE	50				Lima & Bezerra 1991 [336]
B60	Serro do Caiapó	sc. Brazil (17°S, 52°W)	K 120-80	NNE-WNW	150	100			Sial et al. 1987 [489]
VERY POORLY DATED SWARMS									
	<u>Bonfirm Complex-2</u>	Brazil (20.2°S, 44.1°W)	<2800						Carneiro 1991 [112]
	<u>Bonfirm Complex-3</u>	Brazil (20.2°S, 44.1°W)	<2500						Carneiro 1991 [112]
B61	<u>Bonfirm Complex-4</u>	Brazil (20.2°S, 44.1°W)	<2500						Carneiro 1991 [112]
B62	Gioás-2	Brazil (15°S, 50°W)	G 2900-1600	E-NE					Kuyumjian 1991 [321]

¹**Ponta Gross:** The Ponta Grossa swarm converges slightly towards the southeast.

Map Label	Swarm Name	Location	Age (Ma)	Trend	Length (km)	Width (km)	Fan Angle	Focus or Source Direction	Selected References
EUROPE									
C1	<u>Dnipropetrovs'k</u>	Ukraine (47.5°N, 35°E)	>2500	N	100	50			Berkovsky & Platunova 1987 [68]
C2	<u>Murmansk</u>	w. Russia (68°N, 37°E)	>2500	N-NW	150	250			Berkovsky & Platunova 1987 [68]
C3	<u>Kolvitsa</u>	w. Russia ~(67°N, 36°E)	~2450						Alexejev et al. 1995 [16]
C4	<u>Pääjärvi</u> [Boninitic]	Scandinavia, w. Russia (65.6°N, 25.5°E)	U ~2440	SE					Vuollo et al. 1995 [581] Perttunen 1987 [427] J. Vuollo (pers. comm. 1995)
C5	<u>--Viianki</u>	Scandinavia (64.8°N, 30°E)	U ~2440	NE	70	60			Vuollo 1994 [579] J. Vuollo (pers. comm. 1995)
C6	<u>Scourie-Assynt-1</u>	UK (58.1°N, 5.2°W)	U 2418+7/-4	SE	15	40			Barooah & Bowes 1990 [42] a: Heaman & Tarney 1989 [261]
C7	<u>Finnmark</u>	Scandinavia (69°N, 23°E)	2400-2000	NNE	270	150			Gorbatschev et al. 1987 [220]
C8	<u>Tersky</u>	w. Russia (66.5°N, 35°E)	2600-2100	SE	150	10			Berkovsky & Platunova 1987 [68]
C9	<u>Karelian</u> (Eno, Hyppia, Kuusama, Iitsalmi-Nilsia) [T1]	Scandinavia, Russia (64°N, 32°E)	U ~2100	SE	700?	300?			Gorbatschev et al. 1987 [220] Berkovsky & Platunova 1987 [68] Vuollo et al. 1995 [581] Paavola 1987 [409] a: Vuollo 1994 [579]
C10	<u>Kirovohrad</u>	Ukraine (48.5°N, 33°E)	2100-1800	E-ESE	50	50			Berkovsky & Platunova 1987 [68]
C11	<u>North Sweden-1</u>	Scandinavia (68.5°N, 22°E)	2000-1750	N-NNE	100	60			Gorbatschev et al. 1987 [220]
C12	<u>Kola</u> <u>Penninsula-1</u>	Scandinavia (68°N, 37°E)	2000-1750	SE	200	150			Gorbatschev et al. 1987 [220]

C13	Scourie-Assynt-2	UK (58.1°N, 5.2°W)	U 1991±3/-2	SE	15	40			Barooah & Bowes 1990 [42] a: Heaman & Tarney 1989 [261]
C14	Puso [T2]	Scandinavia (63°N, 30°E)	U 1965±10 S 1985±80	SE					Vuollo et al. 1992 [580] Vuollo 1994 [579]
C15	Keuruu-1 (normal polarity)	Scandinavia (62.3°N, 24.7°E)	U ~1880	SE					Pesonen et al. 1991 [429]
C16	Keuruu-2 (reversed polarity)	Scandinavia (62.3°N, 24.7°E)	~1900	SE?					Pesonen et al. 1991 [429]
C17	Orivesi	Scandinavia (62°N, 24.8°E)	~1900	E	30	5			Aro & Laitakari 1987 (p. 86) [31] Aro 1987 (p. 79) [30]
C18	Neidagår'zi (Albite diabases)	Scandinavia (68°N, 23°E)	U 1815±24	~NE					Olesen & Sandstad 1993 [402] a: Krill et al. 1985 [314]
C19	Häme	Scandinavia (61.4°N, 24.8°E)	U ~1667 & ~1646	ESE	150	90			Laitakari & Leino 1989 [#326] Laitakari 1969 [323] Kallio 1987 [299] a: Vaasjoki & Sakko 1989 [564] a: Vaasjoki et al. 1991 [563]
	--Virmaila	Scandinavia (61.5°N, 25.0°E)	U 1667±9	100°	150	60			a: Vaasjoki & Sakko 1989 [564] a: Vaasjoki et al. 1991 [563]
	--Ansio	Scandinavia (61.5°N, 25.0°E)	U 1646±6	120°	80	10			a: Vaasjoki & Sakko 1989 [564]
	-- <u>Mikkeli</u>	Scandinavia (61.5°N, 27.0°E)	~1650	SE-ESE	100	30			I. Laitakari (pers. comm. 1994)
C20	Norrland	Scandinavia ~(62°N, 17°E)	1700-1500	ESE, + radial swarm					Gorbatshev et al. 1987 [220]
C21	Sipoo	Scandinavia (60.3°N, 25.2°E)	G ~1630	SE-E	25	10			Mertanen & Pesonen 1995 [363]
C22	Åland (Föglö, Åland-Åboland) ¹	Scandinavia (60°N, 21°E)	U 1577±12 - 1540±12	NE	80	50			Aro 1986 [29] Gorbatshev et al. 1987 [220] a: Suominen 1991 [524]
C23	Breven-Hällefors (E-W, Eskilstuna, Nordingrån?)	Scandinavia (59°N, 17°E)	R 1535±25	ESE-E	200	200			Gorbatshev et al. 1987 [220] Pesonen et al. 1991 [429] Wikström 1985 [594]

C24	Niemisel	Scandinavia (66.0°N, 22.1°E)	1770-1530						Pesonen et al. 1991 [429]
C25	Värmland sheets (Protogine Zone 1) [hyperite]	Scandinavia (60°N, 13°E)	S 1512±98	sheets					Johansson & Johansson 1990 [293] Bylund 1992 [98] Zeck & Willadsen 1990 [609]
C26	Lofoten	Scandinavia (68.2°N, 16°E)	1650-1450	NE, {SE?}					Gorbatshev et al. 1987 [220]
C27	<u>Azovian Block</u>	Ukraine (47°N, 37°E)	1550-1200	SE	150	100			Berkovsky & Platunova 1987 [68]
	?-- Maloyanisolsky	Ukraine (47.4°N, 37.4°E)	2500-550	138°	55				N. Shatalov (written comm. 1995) Shatalov 1986 [482]
	?-- Kamennomogil- sky	Ukraine (47.3°N, 37.2°E)	2500-550	123°	40				N. Shatalov (written comm. 1995) Shatalov 1986 [482]
	?--Yelisseyev	Ukraine (47°N, 36.4°E)	>550 (>2500?)	129°	45				N. Shatalov (written comm. 1995) Shatalov 1986 [482]
C28	Central Sweden- 1	Scandinavia (65°N, 17°E)	1750-1400	SSE	150	100			Gorbatshev et al. [220]
C29	Kattsund-Koster (includes ? Orust)	Scandinavia (58.5°N, 11.5°E)	R 1421±25	N-NNW	120	10			Hageskov & Pedersen 1988 [230] Hageskov 1987 [229] Gower & Tucker 1994 [222] Gorbatshev et al. 1987 [220] Daly et al. 1983 [143] Åhäll et al. 1990 [11]
	West Sweden Minor	Scandinavia (59.4°N, 14.0°E)	1550-880						Stearn & Piper 1984 [510]
C30	Bobrinets	Ukraine (48°N, 32°E)	1440-1380	SE	150	60			Berkovsky & Platunova 1987 [68]
	--Bobrinets	Ukraine (48°N, 32.4°E)	2500-550	125-130°	170				N. Shatalov (written comm. 1995)
	?--Rozanovka	Ukraine (47.7°N, 32.1°E)	2500-550	152°	125				N. Shatalov (written comm. 1995)
C31	Tuna	Scandinavia (60.5°N, 15.3°E)	R 1371±50	NNE					Pesonen et al. 1991 [429] Bylund 1985 [97] a: Patchett 1978 [421]

C32	Western Norway-1	Scandinavia (64°N, 13°E)	S 1290±52	SSE	80	30			Gorbatshev et al. 1987 [220] a: Mørk & Mearns 1985 [373]
C33	Bornholm (Bölshavn, Listed, Kjeldseå, Kås, Salne, Vaseå, Vigehavn)	Scandinavia (55.1°N, 15.0°E)	P ~1360 P ~1200 P ~950	N-NE					Abrahamsen & Lewandowski 1995 [2] Pesonen et al. 1991 [429]
C34	Satakunta complex	Scandinavia (61°N, 22°E)							Pesonen et al. 1991 [429]
	--Vaasa	Scandinavia (63.0°N, 20.9°E)	R, U 1270-1225						Pesonen et al. 1991 [429] a: Suominen 1987 [523]
	--Märket	Scandinavia (60.3°N, 19.3°E)	U 1265±6						Pesonen et al. 1991 [429] a: Suominen 1987 [523]
	--Satakunta	Scandinavia (61.2°N, 22.0°E)	U ~1240						Pesonen et al. 1991 [429] a: Suominen 1987 [523] Hämäläinen 1987 [243]
C35	Ulvö complex	Scandinavia (63°N, 18°E)	~1270	NNE-E	150	150			Gorbatshev et al. 1987 [220] Pesonen et al. 1991 [429]
	--Väster-Norrland	Scandinavia (62.9°N, 18.3°E)	K 1270-1213						Pesonen et al. 1991 [429] a: Welin & Lundqvist 1975 [589]
	--Gnarp dyke	Scandinavia (61.9°N, 17.2°E)	1245±20						Pesonen et al. 1991 [429] a: Poorter 1976 [441]
	--Nordingrå	Scandinavia (62.8°N, 18.4°E)	~1250						Pesonen et al. 1991 [429]
	--Ulvö	Scandinavia (63.7°N, 18.8°E)	1215±20						Pesonen et al. 1991 [429] a: Larson & Magnusson 1976 [328]
C36	Dala Complex	Scandinavia (61.0°N, 13.0°E)							Pesonen et al. 1991 [429]
	--Särnä	Scandinavia (61.0°N, 13.0°E)	R 1290-1215	SE					Pesonen et al. 1991 [429] a: Patchett 1978 [421]
C37	Protogine Zone-2 [hyperite]²	Scandinavia ~(59°N, 14°E)	S ~1180	N	~500	200			Johansson & Johansson 1990 [293] Bylund 1992 [98] Larson et al. 1990 [327]
C38	Salla dyke	Scandinavia (67°N, 28°E)	~1150	ESE	100				Gorbatshev et al. 1987 [220]

C39	Kovel'	Ukraine (51.5°N, 24°E)	1100-1000	E-NE	200	200			Berkovsky & Platunova 1987 [68]
C40	Annagh Division-1	UK (54.2°N, 10.0°W)	~1000						Menuge & Daly 1990 [362] Winchester & Max 1990 [598]
C41	Kola-Onega	Scandinavia (67°N, 35°E)	~1000	S-SW (fan)	600	500	50°	~ 71°N, 41°E	Berkovsky & Platunova 1987 [68] Gorbatshev et al. 1987 [220]
C42	--Laanila (Ristijärvi)	Scandinavia (69.0°N, 28.0°E)	S 1042±50 S 1013±32	NE	100	10			a: Mertanen et al. 1996 [364] Gorbatshev et al. 1987 [220]
C43	--Kautokeino (Karasjok)	Scandinavia (69.0°N, 25.0°E)	S 1066±34	NE	90	60			a: Mertanen et al. 1996 [364]
C44	Blekinge-Dalarna ³	Scandinavia (59°N, 15°E)	S ~930	NNW-NNE	700	150			Johannson & Johansson 1990 [293] Gorbatshev et al. 1987 [220]
C45	--Protogine Zone-3 [hyperite] ⁴	Scandinavia (56°N, 14°E)	S ~930	NNE	40	10			Johannson & Johansson 1990 [293] Bylund 1992 [98] Larson et al. 1990 [327]
C46	Hunnedalen	Scandinavia (58.8°N, 7.0°E)	950-842	ENE	50	20			Poorter 1972 [440] Pesonen et al. 1991 [429]
	Annagh Division-2	UK (54.2°N, 10.0°W)	700-600						Menuge & Daly 1990 [362] Winchester & Max 1990 [598]
C47	Timan	w. Russia (65°N, 50°E)	680-350	SE-SSE	1500	300			Berkovsky & Platunova 1987 [68]
	Baltoscandian	Scandinavia		N	1000				Andréasson et al. 1992 [23] Andréasson 1987 [21] Solyom et al. 1985 [499]
C48	--Särv Nappe (Särv, Ottfjället)	Scandinavia (65°N, 15°E)	K 665±10	10°	600	200			Andréasson (1994) [22] Solyom et al. 1985 [499] a: Claesson & Roddick 1983 [125]
C49	--Seve Nappe Complex (Sarek)	Scandinavia ~(69°N, 18.5°E)	U ~605						Andréasson (1994) [22] a: Svenningsen 1995 [529]
C50	--Kalak Nappe Complex (Corravare Nappe)	Scandinavia (69.9°N, 21.5°E)	S,R ~580						Andréasson (1994) [22] a: Zwaan & van Roermund 1990 [617]

C51	--Båtsfjord (Kongsfjord) "A"	Scandinavia (70.6°N, 30.0°E)	K ~640	ENE					Rice & Reiz 1994 [464] Bylund & Pesonen 1987 [100] Pesonen et al. 1991 [429] Bylund & Abrahamsen 1985 [99] a: Beckinsale et al. 1976 [49]
C52	Egersund	Scandinavia (58.5°N, 6.0°E)	R ~630	ESE	50	30			Poorter 1972 [440] Pesonen et al. 1991 [429] a: Sundvoll 1987 [521]
C53	?--Göteborg (Tuve, Gothenborg)	Scandinavia (57.7°N, 12.0°E)	P, G ?Egersund	ESE	80				Gorbatshev et al. 1987 [220] Abrahamsen 1974 [1] a: Poorter 1981 (p. 610) [442]
	?--Brattön dyke	Scandinavia (57.4°N, 11.5°E)	<1000	ENE					Pesonen et al. 1991 [429]
C54	<u>L'vov</u>	Ukraine (49°N, 26°E)	≤600	SE	250	150			Berkovsky & Platunova 1987 (fig. 1) [68]
C55	<u>Moskva</u>	w. Russia (55°N, 40°E)	≤600	E	600	200			Berkovsky & Platunova 1987 (fig. 1) [68]
C56	<u>Kirov (Kazhim)</u>	w. Russia (58°N, 51°E)	≤600	NNE	150	50			Berkovsky & Platunova 1987 (fig. 1) [68]
C57	<u>Saratov</u>	w. Russia (51.5°N, 48°E)	≤600	E-ENE	400	250			Berkovsky & Platunova 1987 (fig. 1) [68]
C58	<u>Voronezh</u>	w. Russia (52°N, 41°E)	≤600 ~380?	N-NNW	300	200			Berkovsky & Platunova 1987 [68]
C59	<u>Kuznetsovo- Mikhailovsky</u>	Ukraine (47.8°N, 38°E)	550-250	120°	30				N. Shatalov (written comm. 1995) Shatalov 1986 [482]
	?--Anton- Taramsky	Ukraine (47.7°N, 37.8°E)	650-250	120°	55				N. Shatalov (written comm. 1995) Shatalov 1986 [482]
	?--Pavlopol- Oktiabrsky	Ukraine (47.4°N, 37.8°E)	2500-250	130°	70				N. Shatalov (written comm. 1995) Shatalov 1986 [482]
C60	<u>Kandalaksha Bay</u>	w. Russia (67°N, 33°E)	550-250	NE					Berkovsky & Platunova 1987 [68]
C61	<u>Koli Nappe Complex</u> (Outboard terrane)	Scandinavia ~(69°N, 17.5°E)	~440		400				Stølen 1994a,b [515], [516]

C62	Trégor-1	France (48.8°N, 3.1°W)	~350 & ~440	E	30	10			Ruffet et al. 1992 [472]
	<u>Guingamp</u>	France (48.5°N, 3.2°W)	~330?	N	20	20			Perroud et al. 1986 [426]
C63	St. Malo	France (48.6°N, 2°W)	K,P 330±10	N	30	30			Perroud et al. 1986 [426] Lefort et al. 1995 [334]
	Fougères	France (48.4°N, 0.9°W)	~330?	N	50	40			Perroud et al. 1986 [426]
C64	Anton-Taram	Ukraine (51°N, 33°E)	360-328	SE	200	10			Berkovsky & Platunova 1987 [68]
C65	N. Norway	Scandinavia (70°N, 30°E)	350	N	150	80			Gorbatshev et al 1987 (fig. 1) [220]
C66	Whin-Midland Valley (includes Dunbar, <u>Great Cumbræ Island?</u>)	UK (56°N, 4°W)	K 301±6 302±8	ENE	400	300			Smythe et al. 1995 [497] Macdonald et al. 1981 [341] Floyd 1982 [203] Dunham & Strasser-King 1982 [159] Upton 1982 [562]
C67	Oslo (Bohuslän, Kragerø?) ⁵	Scandinavia (60°N, 10°E)	305-245 (297-285 for earliest tholeiites)	NNW-NNE	300	100			Gorbatshev et al. 1987 [220] Neumann et al. 1992 [393] Thorning & Abrahamsen 1980 [543] a: Sundvoll & Larsen 1993 [522]
	--Kongsberg	Scandinavia (at Kongsberg)		NE					Sundvoll & Larsen 1993 [522]
	?--Arendal	Scandinavia (58.4°N, 8.8°E)	G, P 280-230	NNE?					Pesonen et al. 1991 [429] Halvorsen 1972 [242] Lähde & Pesonen 1985 [322]
	?--Ny Hellesund	Scandinavia (58.0°N, 7.8°E)	K 380-255	NNE?					Halvorsen 1972 [242] Pesonen et al. 1991 [429] a: Halvorsen 1970 [241]
C68	Scania (Permo-Carboniferous Dolerite Group, Tornquist Line)	Scandinavia, Poland (55.7°N, 13.3°E)	K 294±4	105-125°	120	50			Gorbatshev et al. 1987 [220] Pesonen et al. 1991 [429] Smythe et al. 1995 [497] a: Klingspor 1976 [311] a: Lund University... 1988 [339]
C69	Sunnhordland	Scandinavia (60.5°N, 4.7°E)	K 275-160	NNW-N	200	100			Pesonen et al. 1991 [429] Gorbatshev et al. 1987 [220]

C70	Brittany	France (48.4°N, 4.7°W)	K ~200	SE	70	50			Caroff et al. 1995 ⁶ Harrison 1982 [251]
C71	Pyrenees "ophites"	France/Spain (43°N, 0°E)	K ~195	?ESE	300	100			Montigny et al. 1982 [369] Alibert 1985 [19]
C72	Messejana dyke (Alentejo, Odemira)	Spain & Portugal (40°N, 6°W)	K 177±10	NE	500	-			Alibert 1985 [19] a: Schott et al. 1981 [477]
C73	Hornsund	Svalbard (77.1°N, 15.7°E)	100-65	65-90°, {N}	30	10			Brikenmajer & Morawski 1960 [77] Vincenz & Jelenska 1985 [578] Vincenz et al. 1981 [577]
C74	British Tertiary (Hebridean)	United Kingdom (56°N, 5°W)	~60	SE-ESE	400	400			Speight et al. 1982 [506] Macdonald et al. 1988 [343] Dickin 1988 [153] Jolly & Sanderson 1995 [295]
C75	French alpine	France (45°N, 3°E)	~11 - 0.7	NNE-NW	250	120			Féraud et al. 1987 [199]
	--Aubrac	France ~(45°N, 3.2°E)	6.8 - 6.3	SSE					Féraud et al. 1987 [199]
	--Causses	France ~(44.2°N, 3.2°E)	~11 - 6	SSE					Féraud et al. 1987 [199]
	--Verlay	France ~(44.3°N, 4.2°E)	~11 - 6	SE					Féraud et al. 1987 [199]
	--Col de Pertuis	France ~(45.4°N, 4.1°E)	~11 - 6	N					Féraud et al. 1987 [199]
	--Agde	France (43.4°N, 3.5°E)	3.4 - 0.7	N-NNE					Féraud et al. 1987 [199]
	--Escandorgue- Lodévois	France (43.8°N, 3.1°E)	3.4 - 0.7	N-NNE					Féraud et al. 1987 [199]
C76	Sardinia	Sardinia (40°N, 9°E)	3.4 - 0.7	NNW-NNE	100				Féraud et al. 1987 [199]
VERY POORLY DATED SWARMS									
C77	Bazavluk (several ages?)	Ukraine (48°N, 35°E)	2700-1800	N-NNW	250	150			Berkovsky & Platunova 1987 [68]

	--Bazavluk	Ukraine (47.6°N, 34.1°E)	>550 (>2500?)	175°	60				N. Shatalov (written comm. 1995)
	?--Piatikhatki	Ukraine (48.6°N, 33.6°E)	2500-550	355-0°	170				N. Shatalov (written comm. 1995)
C78	Devladovian	Ukraine (48°N, 34.4°E)	>550 (>2500?)	90°	180				N. Shatalov (written comm. 1995)
	?--Chertomlyk- Veselanka	Ukraine (47.3°N, 34°E)	2500-550	90°	125				N. Shatalov (written comm. 1995)
	?--Subbotsk- Moshorin	Ukraine (48.6°N, 32.7°E)	2500-550 (>2500?)	90°	120				N. Shatalov (written comm. 1995)
C79	Gorodnitsk	Ukraine (50.6°N, 27.4°E)	2500-550 (>2500?)	22°	120				N. Shatalov (written comm. 1995)
	?--Tomashgorod	Ukraine (51.2°N, 27°E)	2500-550	335-15°	95				N. Shatalov (written comm. 1995)
	?--Gorin	Ukraine (51.5°N, 26.7°E)	2500-550	37°	55				N. Shatalov (written comm. 1995)
C80	Khmelnik	Ukraine (49.5°N, 27.8°E)	2500-550	140°	45				N. Shatalov (written comm. 1995)
	?--Novograd- Volynsk	Ukraine (50.4°N, 28°E)	2500-550 (>2500>)	122°	125				N. Shatalov (written comm. 1995)
	?--Emilshan	Ukraine (50.7°N, 28°E)	2500-550	136°	90				N. Shatalov (written comm. 1995)
C81	Khopier dyke	w. Russia (50°N, 42°E)		NNE					Berkovsky & Platunova 1987 [68]
C82	<u>Lake Onega</u> <u>Giant dyke</u>	Scandinavia (62°N, 36°E)		NE	100				Gorbatshev et al. 1987 [220]
C83	Nybro- Oskarshamn	Scandinavia (56.8°N, 15.8°E)	2500-900	NE-ENE					Lund University... 1988 [339]
C84	Zvisdal-Zalesk dyke	Ukraine (51.2°N, 29.1°E)		N					Berkovsky & Platunova 1987 [68] N. Shatalov (written comm. 1995)
	--Rudnia- Bazarsk dyke	Ukraine (51.1°N, 29.2°E)		NE					N. Shatalov (written comm. 1995)

Swarms linked with names of individual dykes and subswarms

¹**Åland swarm** (~1550 Ma) = Åboland, Föglö, Sottunga, Bergskär, Västersten, Höggrund, Källsholm, Vidskär

Kumlinge-Bergskär, Kumlinge-Brändö

Reference: Pesonen et al. (1991) [429]

²**Protogine Zone-2 swarm** (1180 Ma) = Röshult, Krängshult, Taberg, Bondstorp, Rumperöd, Kräbbleboda, Assaretorp

Reference: Johansson & Johansson (1990) [293]

³**Blekinge swarm** (930 Ma) = Fäjä, Lösen, Ramdala, Verköon, Tattamåla, Karlshamn, Bräkne-Hoby I, Bräkne-Hoby II

Reference: Johansson & Johansson (1990) [293]

³**Blekinge swarm** (~950 Ma) = Karlshamn, Bräkne-Hoby, Årby, Västra-Nornäs, Falun

Reference: Patchett et al. (1994) [423]

³**Blekinge swarm** (~950 Ma) = Fäjä, Tärnö, Karlshamn, Bräkne-Hoby, Årby (dyke?), Nilstorp (sill), Forserum (sill), Västra-Nornäs, Falun, Baby

Reference: Patchett & Bylund (1977, Fig. 1) [422]

³**Blekinge swarm** (840 Ma) = Härsjön

Reference: Johansson & Johansson (1990) [293]

⁴**Protogine Zone-3 swarm** (930 Ma) = Duvhult, St. Björkeröd, Haggshult, Varestorp, Bjärlöv

Reference: Johansson & Johansson (1990) [293]

⁵**Oslo rift swarm** (~250-300 Ma) = Tonsåsen, Bagn-Ådal, Mjøndalen-Etnedal, Katfoss, Nakkerud, Roa, Bjonvika, Brandbu, Gran, Jevnaker, Nesodden, Ekeberg, Tyvholmen, Storhaug, Raftötången, Bjonvika, Brandbu

Reference: Sundvoll & Larsen (1993) [522]

⁶Reference added in proof: Caroff et al. 1995 (Canadian Journal of Earth Sciences, v. 32, p. 1921-1936.)

Map Label	Swarm Name	Location	Age (Ma)	Trend	Length (km)	Width (km)	Fan Angle	Focus or Source Direction	Selected References
ASIA									
D1	Stanovik	e. Russia ~(56°N, 124°E)	~2700						Moskovchenko et al. 1993 [374]
D2	Bastar-1	India (19°N, 82°E)	2600-2300	SE					Srivastava et al. 1995 [508]
D3	Sutam Belt	e. Russia ~(56.5°N, 125°E)	~2100						Moskovchenko et al. 1993 [374]
D4	Agali-Coimbatore	India (11.2°N, 76.8°E)	R, K 2000-1900	ENE	100	20			Radhakrishna et al. 1995 [450] Radhakrishna & Joseph 1993 [448]
D5	Tukuringra Zone	e. Russia ~(55°N, 125°E)	1900-1800						Moskovchenko et al. 1993 [374]
D6	N. Kerala (Swarm 4)	India (12.0°N, 75.4°E)	K 1700-1400 K 2193±45 S ~1700?	SSE-SE, {NE}	150	100			Radhakrishna et al. 1991 [447] Murthy 1987 [383] a: Balasubrahmanyam 1975 [36] a: Drury 1984 [156]
D7	Dharmapuri (Tiruvannamalai, Swarm 2))	India (12°N, 78°E)	K 1800-1600	SE	500	250			Radhakrishna & Joseph 1993 [448] Halls 1982 [236] Murthy et al. 1987 [384] Murthy 1987 [383]
D8	Karimnagar ¹	India (18°N, 79°E)	K 1700-1650	ENE-NE	500	500			Rao et al. 1990 [454] Halls 1982 [236] a: Murthy et al. 1987 [384] a: Radhakrishna & Joseph 1993 [448]
D9	Kolar (Swarm 3) ¹	India (13°N, 78°E)	K 1800-1600	E-ENE	350	400			Radhakrishna & Joseph 1993 [448] Murthy et al. 1987 [384] Murthy 1987 [383] Halls 1982 [236]
	--Tirupathi	India (14.0°N, 79.0°E)	1800-1750	E					Radhakrishna & Joseph 1993 [448]

	--Mysore	India (14.1°N, 76.3°E)	1800-1750						Radhakrishna & Joseph 1993 [448]
	--Hyderabad	India (17.4°N, 78.5°E)	1700-1650	E					Radhakrishna & Joseph 1993 [448]
	--Harohalli	India (12.8°N, 77.5°E)	1650-1600	E?					Radhakrishna & Joseph 1993 [448]
	--Ananthapur	India (14.4°N, 77.4°E)	1650-1600	ENE					Radhakrishna & Joseph 1993 [448]
	--Bangarpet	India (12.9°N, 78.2°E)	1650-1600	E					Radhakrishna & Joseph 1993 [448]
	Koratagere-1	India (13.5°N, 77°E)	K 1800-1600	NE-E					Dayal & Padmakumari 1995 [148]
D10	<u>Tiruvannamalai</u>	India (12.1°N, 79.0°E)	1650-1600	NE					Radhakrishna & Joseph 1993 [448] Venkatesh et al. 1987 [576]
D11	East Anabar (EA)	e. Russia (70.5°N, 111.0°E)	K 1700-1400	SSE	150	40			Okrugin et al. 1990 [400]
D12	Central Anabar (CA)	e. Russia (70.0°N, 109.0°E)	K 1800-1400	ENE	190	40			Okrugin et al. 1990 [400]
	--Kotuykan (KK)	e. Russia (70.5°N, 109.0°E)	K 1800-1400	ENE	150	40			Okrugin et al. 1990 [400]
D13	Kengede (KD)	e. Russia (69.5°N, 110.0°E)	K 1600-1200	E	280	50			Okrugin et al. 1990 [400]
	--Kuonam (KM)	e. Russia (69.0°N, 111.0°E)	K 1600-1200	E	250	30			Okrugin et al. 1990 [400]
D14	Juken (JK)	e. Russia (70°N, 113°E)	K 1500-1200	SE					Okrugin et al. 1990 [400]
D15	West Anabar (WA)	e. Russia (70.7°N, 105.5°E)	K 1500-1000	NE					Okrugin et al. 1990 [400]

D16	Timptono-Algamaisky (TA)	e. Russia (57°N, 129°E)	K ~1650-990	130°	430	120			Okругin et al. 1995 [399] Blagovyeshchenskaya 1973 [80]
	--Elkono-Gonamsky (EG)	e. Russia (57°N, 129°E)	K ~1650-990	SE	80	50			Okругin et al. 1995 [399]
	--Verkhne-Uchursky (VU)	e. Russia (56°N, 133°E)	K ~1650-990	SE	80	50			Okругin et al. 1995 [399]
D17	Newer (Swarm 6)	India (21°N, 86°E)	K 1600-950	NNE, {SE}	300	200			Murthy 1987 [383] Naqvi & Rogers 1987 (p. 151) [390] a: Sarkar & Saha 1983 [476]
D18	Garhwal	India (30.3°N, 79°E)	1600-900						Ahmad & Tarney 1991 [12] Ahmad et al. 1991 [13]
D19	Kalaro-Nimnyrsky (KN)	e. Russia (58°N, 126°E)	K ~1650-990	65°	600	310			Okругin et al. 1995 [399] Blagovyeshchenskaya 1973 [80]
	--Udokano-Tommotsky (UT)	e. Russia (58°N, 124°E)	K ~1650-990	NE	400	30			Okругin et al. 1995 [399]
	--Olondinsky (OL)	e. Russia (57.3°N, 120°E)	K ~1650-990	NE	200	40			Okругin et al. 1995 [399]
	--Nirektinsky (NR)	e. Russia (58°N, 120°E)	K ~1650-990	NE	190	60			Okругin et al. 1995 [399]
D20	<u>Krasnoyarsk</u>	Russia (56.5°N, 93°E)	1600-550	350-10° {NE}, {SE}	360	60			Soviet Union... 1976b [504]
D21	<u>Tomptokan</u>	e. Russia (57°N, 135°E)	1400-1000	0°	100	100			Shpount & Oleinikov 1987 [486]
D22	<u>--Brindakit</u>	e. Russia (60°N, 137°E)	1400-1000	0°	200	30			Shpount & Oleinikov 1987 [486] Blagovyeshchenskaya 1973 [80] Malich 1980 [349]
D23	Koratagere-2	India ~ (13.5°N, 77°E)	K 1400-1200	NNW-NE					Dayal & Padmakumari 1995 [148]
	Western Hubei-1	China ~ (31°N, 112.5°E)	U ~1332						Goodwin 1991 (p. 364) [219] Yang et al 1986 [608]
D24	<u>Wutai-Taihang</u>	China (39°N, 114°E)	1300-1200	SSE	400	300			Qian & Chen 1987 [444]

D25	<u>Luliang</u>	China (38°N, 111.5°E)	1300-1200	E	50	50			Qian & Chen 1987 [444]
D26	Chieress (CH)	e. Russia (70.8°N, 112.0°E)	K 1200-900	SE	30	30			Okrugin et al. 1990 [400]
D27	Tirupathi (Cuddapah)	India (14°N, 79°E)	R, P 1100-1000	N	600	250			Radhakrishna & Joseph 1993 [448] Rao et al. 1990 [454] Halls 1982 [236]
	Tiptur	India (13.4°N, 76.0°E)	1100-1000						Bhalla et al. 1980 [74] Radhakrishna & Joseph 1993 [448]
D28	<u>Slyudyanka</u>	Russia (51.8°N, 104°E)	900-550	90° (85-130°)	90	15			Soviet Union... 1974 [502]
D29	Western Hubei-2	China ~(31°N, 112.5°E)	K ~950						Goodwin 1991 (p. 364) [219] Yang et al 1986 [608]
D30	Jiangnan Region	China ~(25°N, 112°E)	R ~837						Goodwin 1991 (p. 365) [219] Yang et al. 1986 [608]
D31	<u>Hövsgöl</u>	Mongolia (51°N, 101°E)	K ~680	N					Il'in 1995 [280]
	<u>Sangilen</u>	Mongolia ?(49°N, 99°E)	~600	N					Il'in 1995 [280]
	Arabian-Nubian	Saudi Arabia, Egypt, Israel (22°S, 44°E)	G 800-540	variable	800	1000			Eyal & Eyal 1987 [188]
D32	-- <u>Arabian-Nubian-1</u>	Saudi Arabia (26°N, 44°E)	G 580-540	E-ESE	220	600			Eyal & Eyal 1987 (fig. 1) [188]
D33	-- <u>Arabian-Nubian-2</u>	Saudi Arabia (23°N, 42°E)	G 580-540	SE-SSE	400	300			Eyal & Eyal 1987 (fig. 1) [188]
D34	-- <u>Arabian-Nubian-3</u> (S1 & L1)	Egypt, Israel (29°N, 34°E)	G 580-540 591±9 & <560	NE	350	600			Eyal & Eyal 1987 (fig. 1) [188] Friz-Töpfer 1991 [211] Jarrar et al. 1992 [290] a: Stern & Manton 1987 [512]
	-- <u>Arabian-Nubian-4</u> (S2)	Egypt (28.7°N, 33.8°E)	G ~580-540; < <u>Arabian-Nubian-3</u>	SE					Friz-Töpfer 1991 [211]
D35	<u>Inta</u>	Russia (65°N, 61.5°E)	450-440	45° (15-45°)	210	35			Soviet Union... 1976a [503]

D36	<u>Yeletskiy</u>	Russia (67.3°N, 65°E)	450-440 or 375-325	45°	30	10			Soviet Union... 1976a [503]
D37-40	<u>Yakutsk</u>	see subswarms	~350	NW-S (fan)			140°	66°N, 132°E	Shpount & Oleinikov 1987 [486]
D37	--Chara-Sinsk	e. Russia (61°N, 124°E)	~350	NE	700 (1100)	600			Shpount & Oleinikov 1987 [486] Tomshin and Koroleva 1990 [555]
D38	--Vilyui-Marcha	e. Russia (64°N, 115°E)	~350	NE	800 (1100)	400			Shpount & Oleinikov 1987 [486] Tomshin and Koroleva 1990 [555]
D39	-- <u>Dzhardzhan</u> (Yakutsk Northwest)	e. Russia (69°N, 120°E)	~350	SE	200 (800)	200			Shpount & Oleinikov 1987 [486]
D40	-- <u>Tomporuk</u> (Yakutsk South)	e. Russia (63°N, 137°E)	~350	N	300 (500)	100			Shpount & Oleinikov 1987 [486]
D41	<u>Zhil'Gur</u>	e. Russia (61°N, 127°E)	? ~350	0° (0-10°)	160	90			Blagovyeshchenskaya 1973 [80]
D42	<u>Ebekhaya</u>	e. Russia (72°N, 110°E)	K 298-121 G 250	105°	400	20			Tomshin & Okrugin 1995 [556] a: Malich 1980 [349]
D43	<u>Maymecha</u>	e. Russia (70°N, 101°E)	G ≤250	110-140°	450	130			Blagovyeshchenskaya 1973 [80] Malich 1980 [349]
D44	<u>Bratsk</u>	e. Russia (57.5°N, 101°E)	G ≤250	N-NNW	150	120			Krasnov et al. 1966 (fig. 35) [312]
D45	<u>Kochikha</u>	e. Russia (70.5°N, 97°E)	G ≤250	~90°	220	30			Blagovyeshchenskaya 1973 [80] Shpount & Oleinikov 1987 [486]
D46	<u>Kureyka</u>	e. Russia (69°N, 95°E)	G ≤250	~50°	310	240			Blagovyeshchenskaya 1973 [80]
D47	<u>Mutoray</u>	e. Russia (61.5°N, 102.0°E)	G ≤250	90°	150	60			Blagovyeshchenskaya 1973 [80]
D48	<u>Serebryansk</u>	Russia (49°N, 84°E)	255-245	~NE-E	100	150			Soviet Union... 1978 [505]
D49	-- <u>Tashanta</u>	Russia (50°N, 88°E)	250-205	~90°	50	70			Soviet Union... 1978 [505] Soviet Union... 1974 [502]

D50	Trengganu	Malaysia (5°N, 103°E)	~200						Bignell & Snelling 1977 [76]
D51	<u>Trivandrum</u>	India (8.5°N, 77.1°E)	K 144±6	NE					Radhakrishna et al. 1990 [449]
	Ramon	Israel (30.6°N, 34.9°E)	K ~130	NNE-WNW (fan)	25	10	~90°	to SE	Baer & Reches 1991 [35] Baer 1995 [34]
D52	<u>Ust'Nera</u>	e. Russia (65.0°N, 142.0°E)	100-65	E, NE, N	50	60			Blagovyeschenskaya 1973 [80]
D53	<u>Agali</u>	India (11°N, 76.8°E)	K 105±2	ENE					Radhakrishna et al. 1990 [449]
D54	<u>Kottayam</u>	India (9.7°N, 76.7°E)	K 81±2	SSE	100	5			Radhakrishna et al. 1994 [446] Radhakrishna et al. 1990 [449]
D55	<u>Kerala</u>	India (9.3°N, 76.8°E)	K 69±1	SE	100	60			Radhakrishna et al. 1994 [446] Radhakrishna et al. 1990 [449]
D56	Gondwana (Swarm 7)	India (23.5°N, 87.0°E)	112.2±2.7 to 56.7±1.5	SE-SSE					Murthy 1987 [383] a: Agarwal & Rama 1976 [10]
D57	Narmada-Tapti- Son (Dediapada- Nandurbar, Swarm 9)	India (21°N, 76°E)	K 80-37	E-ENE	600	200			Murthy 1987 [383] Karkare & Srivastava 1990 [305] Sant & Karanth 1990 [475] Auden 1949 [33] Srivastava 1991 [507]
	--Sajwa- Ambadonger	India (22°N, 74.2°E)		ENE, SE					Sant & Karanth 1990 [475]
D58	<u>Panvel</u>	India (20.0°N, 73°E)	K 84-36 80.8±3 to 37.3±1.8 (2 swarms)	N-NNE	250	100			Murthy 1987 [383] Karkare & Srivastava 1990 [305] Dessai & Bertrand 1995 [151]
D59	<u>Mt. Girnar</u>	India (21.4°N, 72.0°E)	K ~72 K ~58	E-ENE	200	150			Murthy 1987 (fig. 1) [383] Auden 1949 [33]
D60	<u>Cambay</u>	India ~(22°N, 74°E)	~Narmada- Tapti-Son	N-NW					Bhattacharji 1988 [75]
D61	Jizhong- Huanghua Basin	China (36°N, 116°E)	60-25						Zhou et al. 1988 [614]

D62	Xialiaohe-Bohai Basin	China (42°N, 123°E)	60-25						Zhou et al. 1988 [614]
D63	Subei Basin	China (33°N, 120°E)	60-25						Zhou et al. 1988 [614]
D64	Red Sea	Saudi Arabia & Egypt (23°N, 39°E)	~20	SE	1600 (2500)	400			Eyal and Eyal 1987 [188] Baldrige et al. 1991 [37] Camp & Roobol 1992 [108]
	--Tihama²	Yemen (15°N, 43.1°E)	22-20 (21±1)	SE-SSE	320				Mohr 1991 [367] Manetti et al. 1991 [351]
	--Tihamat 'Asir sheeted dyke complex (Jabal at Tirf?)	Saudi Arabia ~(17.6°N, 43.1°E)	24-20	155°					Mohr 1991 [367]
	--PBD (Hajjah)³	Yemen (15.5°N, 44.2°E)	27-26	SSE	370				Mohr 1991 [367]
	--Qafr-Dubas	Yemen (14°N, 43.8°E)		SE-SSE					Mohr 1991 [367]
	--Iktefa	Egypt (Sinai) (30.4°N, 33.8°E)	~20?	NE-N	60				Baldrige et al. 1991 [37]
	--Raqabet Na'ame	Egypt (Sinai) (29.7°N, 33.5°E)	~20?	E	60				Baldrige et al. 1991 [37]
D65	--<u>Djebel Druze</u>	Iraq-Jordon-Iraq- Saudi Arabia- Syria (31°N, 38°E)	20-5	SE-SSE	450	250			Féraud et al. 1987 [199]
D66	<u>Ammān</u>	Iraq-Jordon-Saudi Arabia-Syria (32°N, 37°E)	≤5	N-NNW	650	400			Féraud et al. 1987 [199]
D67	<u>Al Ghayl</u>	Yemen (16.5°N, 44.7°E)	<65	45° (35-50°)	100	100			Kruk 1980 [317]
D68	<u>Amid Dhu</u>	Yemen (16.5°N, 44.8°E)	<65	90° (80-100°)	100	80			Kruk 1980 [317]
D69	<u>Lahji</u>	Yemen (13.6°N, 44.8°E)	≤24	~135°	70	290			Great Britain... 1967 [223]

D70	Kuantan (several swarms?)	Malaysia (4°N, 103°E)	~110-2						Bignell & Snelling 1977 [76]
VERY POORLY DATED SWARMS									
D71	<u>Aravalli-1</u>	India (24.5°N, 79°E)	2500-1600	SE	100	100			Murthy 1987 [383]
D72	<u>Aravalli-2</u>	India (25.1°N, 76.4°E)	<2500	NE					Murthy 1987 [383]
	Bastar-2	India (19°N, 82°E)	<2300	SE					Srivastava et al. 1995 [508]
	Hebei Province-1	China ~ (38°N, 117°E)	G <3000 S >2300	ENE-E					He & Hulwen 1991 [255]
	Hebei Province-2	China ~ (38°N, 117°E)	G <Hebei Province-1	ESE					He & Hulwen 1991 [255]
	Hebei Province-3	China ~ (38°N, 117°E)		? NE, N					He & Hulwen 1991 [255]
D73	Hebei Province-4	China ~ (38°N, 117°E)		N or NNE					He & Hulwen 1991 [255]

¹**Karimnagar** and **Kolar**: are probably intermixed.

²**Tihama**: includes the following (sub)swarms (Mohr 1991) [367]:

Marah, Al Uthayb, J. Qafr, Suay'hira, J. Dubas, W. as Sanam, J. Qawnis, Al Khurab, Wadi Ribat, Izzan, W. Izzan, W. Hatab, W. Tabab, al'Urjayn, Ghulaysi, Al Murran, Al Bukah, J. Hajibah, Wadi La'ah, W. Bawhal, J. Hirab, Wadi Ram

³**PBD (Plateau Basalt dykes)**: include the following (sub)swarms (Mohr 1991) [367]:

Nagd, Ta'izz, Hidhran, Hajdah, Abdah, Maqwalah, Bani Ali, Az Zahr, Askari, Al Ithnayn, Al Hurmiyah, Kuhlan, J. Bahara, Yazil, Mafhaq, Madar, Maghrabah, Al Qadam, Darajah, Wadi Zahr-d, Wadi Zahr-g, Hajjah, Kuhlan, Al Mahasir, J. Shaharah, W. Gumalay

Map Label	Swarm Name	Location	Age (Ma)	Trend	Length (km)	Width (km)	Fan Angle	Focus or Source Direction	Selected References
AFRICA									
	Causeway dyke	ne. South Africa (22°S, 30°E)	3566±100	ENE					Hunter & Reid 1987 [279] Barton et al. 1990 [43] Mubu 1995 [376]
E1	Stockford	ne. South Africa, Botswana (22°S, 30°E)	~3000	ENE	150				Barton et al. 1990 [43] Hunter & Reid 1987 [279] Wilson et al. 1987 [597] Mubu 1995 [376]
E2	<u>Kruger Park</u>	ne. South Africa (25.0°S, 31.3°E)	G >2650	E	100	60			Havenga 1995 [253] Hunter & Reid 1987 [279] A. Havenga (pers. comm. 1995)
E3	<u>Barberton-1</u>	ne. South Africa (26.5°S, 30.9°E)	G >2800 <3200	135° (135-160°)	100	80		source to the SW	Hunter & Halls 1992 [278] Havenga 1995 [253] A. Havenga (pers. comm. 1995)
	--Usushwana	ne. South Africa (27°S, 31°E)	S 2871±30 R 2813±30	SE	90	60			Hunter & Reid 1987 [279] Hunter & Halls 1992 [278]
E4	<u>Barbeton-2</u> (post-Transvaal)	ne. South Africa (26.2°S, 30.5°E)	G 2600-1900	NNE-ENE	80	90			Hunter & Halls 1992 [278] Havenga 1995 [253] A. Havenga (pers. comm. 1995)
E5	Tegina (?Ilesha)	Nigeria (12°N, 5°E)	~2700?						Ekwueme 1990 [165]
E6	<u>Francistown</u>	ne. Botswana (20.3°S, 27°E)	~2700?	ENE	50				Hunter & Reid 1987 [279] Litherland 1975 [337]
E7	Mashaba-Chibi ¹	c. Zimbabwe (20°S, 30.5°E)	~2700	ESE, ENE & concentric ("radial and ring pattern")					Wilson et al. 1987 [597]

E8	<u>Tanzania-1</u> (Swarm I)	Tanzania (4°S, 34°E)	K 2600-2200	ENE	400	350			Halls et al. 1987 [238]
E9	<u>Zoug</u>	Western Sahara (Morocco), Mauritania (21°N, 14.4°W)	>2500?	0-20°	320	170			Sénégal... 1960 [480] Mauritane... 1960 [356] AOF... 1953b,c,d [26], [27], [28] Haute-Volta...1961 [252]
E10	Great Dyke and its satellites	Zimbabwe (20°S, 30°E)	R 2460±16	NNE	600	100			Wilson et al. 1987 [597] a: Hamilton 1977 [244]
E11	Plumtree	Zimbabwe (19°S, 29°E)	~2150	NE	450	100			Wilson et al. 1987 [597]
E12	<u>Swaziland-1</u>	Swaziland ~(27°S, 31.3°E)	2500-1750	SE					Hunter & Reid 1987 [279]
E13	<u>Swaziland-2</u>	Swaziland ~(27°S, 31.3°E)	2500-1750, <Swaziland-1	E					Hunter & Reid 1987 [279]
E14	<u>Okwa Inlier-1</u>	Botswana (23°S, 22°E)	~2000	deformed					Aldiss & Carney 1992 [15]
	<u>Mafingi Range</u>	Zambia, Malawi ~(10°S, 33.4°E)	K ≥1330 ~2000						Mossman 1976 [375] Fitches 1968 [202]
E15	<u>Machinje Range</u>	Zambia (13°S, 32.3°E)	?=Mafingi Range	125-130°, {35°}	80	60			Mossman 1976 [375]
E16	<u>Transvaal-1</u>	ne. South Africa (23.4°S, 30.0°E)	R 1905±245	ENE	250	180			Hunter & Reid 1987 [279]
E17	Mashonaland- Sebanga	Zimbabwe (19°S, 32°E)	R 1830±230	SSE	350	500			Wilson et al. 1987 [597] Wilson 1990 [596]
E18	--Mazowe	Zimbabwe (17°S, 32.5°E)	P ~Mashona- land	E	200	70			Wilson et al. 1987 [597]
E19	--Bubi-Crystal Springs	Zimbabwe ~(21.5°S, 29.8°E)	P ~Mashona- land	SSE					Robertson 1973 [466] Wilson et al. 1987 [597] a: Jones et al. 1975 [297]
E20	<u>Tanzania-2</u> (Swarm II)	Tanzania (5°S, 33°E)	>1800	N-NNW	800	350			Halls et al. 1987 [238]
E21	<u>Marungu Plateau</u>	Zaire (8°S, 28°E)	~1750	NE, SE, E					Kabengele et al. 1990 [298]

E22	<u>Transvaal-2</u>	ne. South Africa (26°S, 26.5°E)	K 1740±30	ENE					Hunter & Reid 1987 [279]
E23	<u>Transvaal-3</u> (Kaapvaal-1)	ne. South Africa (25°S, 30°E)	<1700	SE	600	200			Hunter & Reid 1987 [279]
	Alberta Complex	Namibia (23.6°S, 16.4°E)	G ~1440						Schalk in Ziegler & Stoessel 1993 (p. 61) [615] a: Reid et al. 1988 [459]
E24	Guperas	s. Namibia (26.5°S, 16.5°E)	1360-1290 or 1100-1000	NNE?	200	30			Hunter & Reid 1987 [279]
E25	<u>Oban Massif-1</u>	Nigeria (6°N, 8.5°E)	R ~1300						Ekwueme 1990 [165]
E26	Pilanesberg	nc. South Africa (25°S, 27°E)	~1300	N-NW	350	100			Hunter & Reid 1987 [279]
E27	Guruve- Kamativi (Deweras dyke, Umfuli dyke)	see subswarms	R,P 1300-500	NE	500	150			Wilson et al. 1987 [597]
	--Guruve	Zimbabwe (17°S, 31°E)		NE	150	50			Wilson et al. 1987 [597]
	--Kamativi	Zimbabwe (19°S, 27°E)		NE	100	50			Wilson et al. 1987 [597]
E28	<u>Okwa Inlier-2</u>	Botswana (23°S, 22°E)	G 1800-1100	NE	100?	100?			Aldiss & Carney 1992 [15]
E29	<u>Caimbambo</u> (Bembe, Quilengues)	Angola (13.3°S, 13.8°E)	K 1175±69 1281±22	120°	180	330			Angola... 1981 [24] Silva & Balões 1991 [491] Simpson 1970 [492]
E30	<u>Camucuo</u> (Bembe, Ompupa)	Angola (14.2°S, 13.2°E)	R 1119±27	165-170°	350	410			Angola... 1981 [24] Silva & Balões 1991 [491] Simpson 1970 [492]
E31	Umkondo	Zimbabwe (18°S, 31.5°E)	~1100	NNE					Wilson et al. 1987 [597]
E32	Middelplaat	sw. South Africa (30°S, 17.5°E)	1100-1000, R 1042±75	ENE	100	50			Hunter & Reid 1987 [279]
E33	<u>Sibiti</u>	Congo (3°S, 14°E)	? ~Francevillian	350-40°	100	40			AEF... 1960, 1958, 1953, 1950 [9],[5],[4], [3]

E34	?-- <u>Ouessou</u>	Congo (1.5°N, 15.5°E)		20°	80	100			AEF... 1957 [8]
	?-- <u>Francevillian</u>	Gabon ~(2°S, 13°E)	K ~970	N, E					Bonhomme et al. 1982 [83]
E35	<u>Central African Republic</u>	Central African Republic (4°N, 19°E)	~950	NE?	800?				Dostal et al. 1985 [154] Poidevin 1979 [439]
	-- <u>Bangui</u>	Central African Republic (4.8°N, 19°E)		~70°	15	10			AEF... 1964 [7]
E36	<u>Beni</u>	Zaire (0.7°N, 29.6°E)	G ~900	30°	150	40			Thibaut 1982 [542]
E37	<u>Palabala</u>	Zaire (5.8°S, 13.5°E)	? 900-550						Goodwin 1991 (p. 514) [219] Franssen & André 1988 (p. 219) [204]
E38	<u>Bir El Khzaim</u>	Western Sahara (Morocco), Mauritania, Mali, Algeria (24°N, 9°W)	~850	350-10°	600	870			Mali... 1980 [348] Maroc... 1985 [354] a: Lefort et al. 1994 [333] Algerie... 1958b [18] a: Aifa et al. 1993 [14]
E39	post-Gamsberg (Nauzerus)	Namibia (23.6°S, 16.6°E)	R 821±33 R 1030±185	NE (NE-NNE)	~150	~100			Ziegler & Stoessel 1993 [615] Reid et al. 1988 [459]
E40	<u>Vila de Almoester</u>	Angola ~(15.8°S, 12.3°E)	800±13	N?	50	20			Silva & Balões 1991 [491]
E41	<u>Tanzania-3</u> (Swarm III, more than 1 swarm?)	Tanzania (5°S, 33°E)	<1800, some ~180?, ~800?	N	900 -1400	350			Halls et al. 1987 [238]
E42	<u>Tanzania-4</u> (Swarm IV, Bukoban?)	Tanzania (3°S, 32°E)	~800	ENE-NE	300	100			Halls et al. 1987 [238]
E43	<u>Tanzania-5</u> (Swarm V)	Tanzania (1.8°S, 34.2°E)	~800	ESE	80	130			Halls et al. 1987 [238]
E44	<u>Gannakouriep</u>	South Africa- Namibia (29°S, 17°E)	G 900-500 R 717±11	NE-N (fan)	300	100	25°	30°S, 17°E	Ransome 1992 [453] Reid et al. 1991b [460] Gresse & Scheepers 1993 [228]
E45	<u>Seychelles-1</u>	Seychelles ~(4°S, 55°E)	A ~620±20						Plummer 1995 [438] a: Hargraves & Duncan 1990 [249]

E46	Erkowit-1	Sudan (18.7°N, 37.2°E)	K ~600	125-140°	80	60			Vail & Hughes 1977 [568] Vail 1974a [565]
	Erkowit-2	Sudan (18.9°N, 37.2°E)	K ~600	170-190°	90	60			Vail & Hughes 1977 [568] Vail 1974a [565]
	Erkowit-3	Sudan (18.6°N, 36.9°E)	K ~600	70-90°	50	60			Vail & Hughes 1977 [568] Vail 1974a [565]
E47	Mutare	Zimbabwe (18°S, 32°E)	P,R 600-500	SSE-SE	400	50			Wilson et al. 1987 [597]
E48	<u>Ilaferh</u>	Algeria, Mali (21°N, 2°E)	G <550	55°	240	40			Karpoff 1960 [306]
E49	<u>Azerraf</u>	Algeria, Mali (21.3°N, 3°E)	G <550	15°	290	170			Karpoff 1960 [306]
E50	<u>Khadra</u>	Morocco, Algeria, Mauritania (26.8°N, 7.8°W)	G <=375	60°	230	25			Maroc... 1985 [354] Algerie... 1958a [17]
E51	Liberian	Liberia, Sierra Leone, (7°N, 10°W)	A 204±3 to 197±2	SE	~1000				May 1971 [358] Oliveira et al. 1990 [406] Dupuy et al. 1988 [162] a: Bertrand et al. 1991 [72]
E52	Moroccan	Morocco, Algeria, Mauritania, West Africa (30°N, 8°W)	~200	NE	~1400				May 1971 [358] Oliveira et al. 1990 [406] Bertrand et al. 1982 [71] Hailwood & Mitchell 1971 [231]
E53	<u>Zagora</u> (part of Moroccan swarm?)	Morocco (29.3°N, 7.4°W)	187-181	45°	370	80			Maroc... 1985 [354]
E54	Central Karoo (several swarms)	South Africa (30°S, 28°E)	A 182±2	variable	1200	900			Hunter & Reid 1987 [279] Mubu 1995 [376] a: Hooper et al. 1993 [275]
	--Gap	South Africa (32°S, 28°E)	~180	E	200	80			Eales et al. 1984 [163]

E55	Botswana (Duvi, Buby) [Limpopo]	Zimbabwe-Botswana (21°S, 25°E)	K 184±7	ESE	1300				Eales et al. 1984 [163] Hunter & Reid 1987 [279] Wilson et al. 1987 [597] Reeves 1978 [456] Mubu 1995 [376] Stettler et al. 1989 [513] a: Jacobsen et al. 1979 [289]
E56	Orange River Fracture Zone	South Africa (26°S, 30.5°E)	~180	20° (20-45°)	>300, perhaps 1200	100			Mubu 1995 [376] Stettler et al. 1989 [513]
E57	Lebombo	South Africa (24°S, 31.5°E)	~180	N	200	50			Eales et al. 1984 [163] Hunter & Reid 1987 [279] Mubu 1995 [376]
E58	?--Rooi Rand	e. South Africa (27.5°S, 32.1°E)	K 188±5	N-NNW	130	20			Duncan et al. 1990 [158] Kattenhorn & Watkeys 1995 [307] Watkeys et al. 1995 [587] Saggerson et al. 1983 [474] a: Cleverly 1977 [126]
E59	Limpopo (Sabi)	Zimbabwe (21°S, 31°E)	G ~180	ENE	600	150			Wilson et al. 1987 [597] Wilson 1990 [596] Eales et al. 1984 [163]
E60	Rushinga	ne. Zimbabwe, Mozambique (16.8°S, 32.7°E)	~180	SE	110	30			Wilson et al. 1987 [597]
	--Inhamangombe	Malawi (16.3°S, 33°E)	~180	SSE	65	20			Eales et al. 1984 [163] Macdonald et al. 1983 [340]
E61	Luwumbu dyke	Zambia-Malawi (11°S, 33.3°E)	~180	NNE	500				Mossman 1976 [375] Halls et al. 1987 [238]
E62	Cholo	Malawi (16°S, 35°E)	~180	NE	100	140			Eales et al. 1984 [163] Woolley et al. 1979 [605] Woolley & Garson 1970 [606]
E63	Nsanje	Malawi (18°S, 34.1°E)	~180	N	80	20			Eales et al. 1984 [163]
E64	Tanzania-7 (Swarm VII)	Tanzania (8.2°S, 35.9°E)	~180?	NNE	150	250			Halls et al. 1987 [238]

E65	<u>Karub</u>	Namibia (22.2°S, 15.2°E)	<180?	26°	200	100			Namibia... 1966, 1942, 1938 [388],[387],[386] Zeigler & Stoessel 1993 (p. 61) [615]
E66	Cape Peninsula (False Bay) [Western Province]	sw. South Africa (34.0°S, 18.5°E)	132±6	SE	80	70			Reid 1990 [457] a: Reid et al. 1991a [458] Day 1987 [147]
E67	Mehlberg dyke	South Africa- Namibia (28°S, 17°E)	A 134±3	SE	170				Reid & Rex 1994 [461]
E68	Horingbaai-1	Namibia (21.3°S, 13.9°E)	A 130-125	135°	70	30			Namibia... 1988 [389] Duncan et al. 1990 [158] a: Erlank et al. 1984 [170]
	Horingbaai-2	Namibia (21.3°S, 13.8°E)	A 130-125	0°	60	30			Namibia... 1988 [389] Duncan et al. 1990 [158] a: Erlank et al. 1984 [170]
E69	Etendeka	Namibia (20°S, 16°E)	<550 ? ~130	140°	400	200			Mubu 1995 [376] Hawkesworth et al. 1992 [254]
E70	Northern Namibia	Namibia (19°S, 17.5°E)	<550	~60°	350	350			Mubu 1995 [376]
E71	<u>Seychelles-2</u>	Seychelles ~(4°S, 55°E)	~135						Plummer 1995 [438]
E72	<u>Madagascar</u>	Madagascar (18°S, 46°E)	~88	290-15° (fan)			90°	24.4°S, 47.3°E	Storey et al. 1995 [518]
	--Ejeda-Bekily	Madagascar (23.8°S, 45°E)	~88	~290°	80				Storey et al. 1995 [518]
	--Morondava	Madagascar (18.3°S, 45°E)	~88	~325°, {NE}	350	200			Storey et al. 1995 [518]
	--Tamatove	Madagascar (17.6°S, 49.2°E)	~88	~15°, {E}	480	40			Storey et al. 1995 [518]
E73	<u>Seychelles-3</u> (Praslin)	Seychelles ~(4°S, 55°E)	~70-60						Plummer 1995 [438] Devey & Stephens 1991 [152]
E74	<u>Kumba</u>	Cameroon (5.2°N, 9.1°E)	? <65	~0°	80	20			Cameroun... 1968 [107]

E75	Afar (Ethiopian Plateau and Rift Valley) ²	Ethiopia ~(12°N, 42.5°E)	K mainly 24±3 minor 13±2						Mohr & Zanettin 1988 (fig. 3 & pp. 83-84) [368] Mohr 1978 [366]
E76	Kaparaina	Kenya (0.6°N, 36°E)	<5	NNE					Swain 1992 [530] Chapman et al. 1978 (p. 280) [119]
VERY POORLY DATED SWARMS									
E77	<u>Ansongo</u>	Mali (15.0°N, 1.0°W)		60°	180	90			Mali... 1980 [348]
E78	<u>Ayorou</u>	Niger, Burkina Faso (14.7°N, 1.0°E)	≤ 2100	120°	300	450			Machens 1966 [345] Bérard & Tanguay 1972a,b,c,d,e [57],[58],[59],[60],[61] Hottin & Ouedraogo 1976 [276] Bos 1967 [84] Vyain 1967 [582] Haute-Volta... 1961 [252]
E79	<u>Banfora</u>	Burkina Faso, Cote d'Ivoire (10.5°N, 4.4°W)		30-40°	110	170			Hottin & Ouedraogo 1976 [276] Marcelin 1971 [352]
E80	<u>Barrhot</u>	Niger (17.7°N, 9.5°E)		135°	100	50			Bérard & Tanguay 1972j,k [66],[67]
E81	<u>Diapaga</u>	Niger, Burkina Faso (13.8°N, 1.5°E)	≤ 2100	0°	400	150			Machens 1966 [345] Bérard & Tanguay 1972a,b,c,d,e [57],[58],[59],[60],[61] Hottin & Ouedraogo 1976 [276] Bos 1967 [84] Vyain 1967 [582] Haute-Volta... 1961 [252]
E82	<u>Doutoufouk</u>	Niger (14.1°N, 9.2°E)	≤ 2100	~0°	50	50			Bérard & Tanguay 1972f,g,h,i [62],[63],[64],[65]
E83	<u>El Geneina</u> ³	Sudan (13.3°N, 23.0°E)		140°	300	160			Vail 1978 [567] Vail 1974a,b [565], [566]
E84	<u>?--Kebkabiya</u> ³	Sudan (13.2°N, 25.0°E)		120°	220	50			Vail 1978 [567] Vail 1974a [565]
E85	<u>Fdèrik</u>	Western Sahara (Morocco) (23°N, 13°W)	G <Zoug >510	150-170°	200	230			Maroc... 1985 [354]

E86	<u>Gebel Natitai</u> ³	Egypt (22.8°N, 35°E)		~70°	90	50		Vail 1978 [567] Vail 1974a [565]
E87	<u>Gouré</u>	Niger (14.2°N, 9.6°E)	≤ 2100	120-150°	90	50		Bérard & Tanguay 1972f,g,h,i [62],[63],[64],[65]
E88	<u>Grabo</u>	Cote d'Ivoire, Liberia (4.7°N, 7.5°W)	< 2100	0°	150	150		AOF... 1953a [25]
E89	<u>Iriba</u> ³	Sudan (15°N, 22°E)		~30°	140	100		Vail 1978 [567] Vail 1974a [565]
E90	<u>Jebel Rahib</u> ³	Sudan (17.8°N, 28°E)		0°	40	70		Vail 1978 [567] Vail 1974a [565]
E91	<u>Jos</u>	Nigeria (10°N, 8.7°E)		25°	110	80		Nigeria... 1965 [396]
E92	<u>Kellé</u>	Niger (14.2°N, 10.2°E)	≤ 2100	20-40°	90	110		Bérard & Tanguay 1972f,g,h,i [62],[63],[64],[65]
E93	<u>Lubero</u>	Zaire (0.2°S, 28.8°E)	? 1600-900	70 (ENE)	400	550		Thibaut 1982 [542]
E94	<u>Nepoko</u>	Zaire (2.1°N, 27.2°E)	? 1600-900	0°	350	400		Thibaut 1982 [542]
E95	<u>Oyem</u>	Río Muni (2°N, 11.5°E)		30-60°	200	150		AEF... 1959 [6] Cameroun... 1956 [105] Cameroun... 1957 [106]
E96	<u>SE Mauritania</u> ⁴	Mauritania ~(17°N, 10°W)		65° (60-70°)	~300	~250		May 1971 [358] Oliveira 1990 [406]
E97	<u>Sudan</u> ^{3,5}	Sudan (21°N, 32°E)		90° (80-90°)	1500	1200		Vail 1978 [567] Vail 1974a,b [565], [566]
E98	--Third Cataract	Sudan (19.8°N, 30.5°E)		E-ENE	430	130		Vail 1978 [567] Vail 1974a [565]
E99	--Nuba Mountains	Sudan (11°N, 30°E)		E	300	100		Vail 1978 [567] Vail 1974a [565]
E100	<u>Takolu</u>	Niger (18.2°N, 9.6°E)		~40°	70	80		Bérard & Tanguay 1972j,k [66],[67]
E101	<u>Tanzania-6</u> (Swarm VI)	Tanzania (9°S, 34°E)		SE	400	100		Halls et al. 1987 [238]

E102	<u>Tanzania-8</u> (Swarm VIII)	Tanzania (7.0°S, 35.8°E)		SSE	270	150			Halls et al. 1987 [238]
E103	<u>Tarhmert</u>	Niger (18.6°N, 9.3°E)		~90°	40	120			Bérard & Tanguay 1972j,k [66],[67]
E104	<u>Techla</u>	Western Sahara (Morocco), Mauritania, Mali (21.5°N, 15°W)	G <Zoug >510	E-ENE	1400	370			Mauritane... 1960 [356] Maroc... 1985 [354] Mali... 1980 [348]
E105	<u>Timia</u>	Niger (18.2°N, 9.0°E)		~0°	60	30			Bérard & Tanguay 1972j,k [66],[67]
E106	<u>Tiznit</u>	Morocco (29.4°N, 9.6°W)	≥ 550	110°	40	30			Maroc... 1985 [354]
E107	<u>Toro</u>	Nigeria (10.2°N, 8.8°E)		150°	100	60			Nigeria... 1965 [396]
E108	<u>Uele</u>	Zaire (3.5°N, 25.2°E)	2500-550	150°	800	350			Thibaut 1982 [542]
E109	<u>Uwet-Obudu</u>	Nigeria (8°N, 9°E)	? <500	NE-ENE	240?	60?			Ekwueme 1990 [165]
	<u>--Uwet</u>	Nigeria (5.3°N, 8.5°E)		NE-ENE	50?	70?			Ekwueme 1990 [165]
	<u>--Obudu</u>	Nigeria (8°N, 9°E)		NE-ENE	140?	60?			Ekwueme 1990 [165]

¹Mashaba-Chibi dykes have trends and distribution which appear to form the remains of a modified radial and ring pattern (Wilson et al. 1987 (p. 437) [597]).

²Afar: Component swarms include: 'western Afar margin', Bashillo, Guder, Semien shield-1, Semien shield-2, Cawa caldera, Amaro horst, Sagatu (Mohr & Zanettin 1988 (fig. 3 & pp. 83-84) [368]).

³These swarms may include non-diabases (Vail 1978 [567]).

⁴SE Mauritania: a possible component of the 200 Ma Central Atlantic reconstructed radiating swarm (Table 2). Included as part of the swarm by May 1971 [358], but not by Oliveira 1990 [406]

⁵Sudan: includes dyke concentrations near Derudeb, the Nuba Mountains, the Third Cataract, Darfur, Sodiri (in central Kordofan) and Merowe. Given the absence of dating, each of these regions could represent separate swarms.

Map Label	Swarm Name	Location	Age (Ma)	Trend	Length (km)	Width (km)	Fan Angle	Focus or Source Direction	Selected References
AUSTRALIA									
F1	Black Range	nw. Australia (21.5°S, 119°E)	U 2771±2	N-NNE	400?	200			Parker et al. 1987 [418] Blake 1993 [81] a: Wingate et al 1995 [600]
F2	<u>Paddington</u> (Suite 4)	w. Australia (30.5°S, 121.3°E)	2500-2100	E	600	600			Isles & Cooke 1990 [285] Boyd & Tucker 1990 [89] Parker et al. 1987 [418]
F3	<u>Hamersley Basin-1</u>	nw. Australia (22°S, 117°E)	~2500-1750	SE	300	100			Parker et al. 1987 [418] Boyd & Tucker 1990 [89]
F4	<u>Wonominta Block-1</u> (D1)	se. Australia ~(31°S, 142°E)	2500-1000						Zhou & Mills 1990 [613]
F5	<u>Cobbold</u> (Georgetown Inlier-1)	ne. Australia ~(18°S, 144°E)	S <2490	deformed					Parker et al. 1987 [418] a: Black & McCulloch 1984 [79]
F6	Widgiemooltha (Suite 3)	w. Australia (32°S, 120°E)	R ~2400	E-ENE	750	850			Parker et al. 1987 [418] Isles & Cooke 1990 [285] Boyd & Tucker 1990 [89] Evans 1968 [186] a: Turek 1966 [559]
F7	<u>Halls Creek Province-1</u>	n. Australia ~(18°S, 127°E)	~2000	deformed					Parker et al. 1987 [418]
F8	<u>Mt. Isa Block-1</u> (B1, Basement-1)	n. Australia (21°S, 140°E)	? ~1780	NNW-NNE					Ellis & Wyborn 1984 [167]
F9	<u>Mt. Isa Block-2</u> (W1-E2, Western 1-Eastern 2)	n. Australia (21°S, 139.5°E)	~1780	N	300	70			Parker et al. 1987 [418] Ellis & Wyborn 1984 [167]
F10	<u>Halls Creek Province-2</u>	n. Australia (17.5°S, 128°E)	? ~1760	SE	80	220			Parker et al. 1987 [418]

F11	<u>Mt. Isa Block-3</u> (W2-E3, Western 2-Eastern 3)	n. Australia (20°S, 140°E)	~1740-1600	N-NE	300	150			Parker et al. 1987 [418] Ellis & Wyborn 1984 [167]
F12	Ravensthorpe	w. Australia (34°S, 118°E)	1750-1400	E-ENE	500	200			Parker et al. 1987 [418] Boyd & Tucker 1990 [89] Giddings 1976 [214]
F13	Perth region (YA)	w. Australia (31°S, 117°E)	1750-1000	SE-SSE	1000	900			Parker et al. 1987 [418] Boyd & Tucker 1990 [89] Giddings 1976 [214]
F14	<u>Parkeston</u> (Yilgarn-6, Suite 6)	w. Australia (30.6°S, 122.2°E)	1750-1000?	ESE	200	400			Boyd & Tucker 1990 [89] Isles & Cooke 1990 [285]
F15	Cleve (Gawler B)	s. Australia (35°S, 136°E)	~1600	N	200	200			Parker et al. 1987 [418] Giddings & Embleton 1976 [215] Parker 1990 [417]
F16	<u>McArthur Basin-2</u>	n. Australia (14.5°S, 133°E)	1400-1000	ENE	120	70			Parker et al. 1987 [418] Tucker & Boyd 1990 [89]
F17	<u>Kimberley Basin</u>	n. Australia (15°S, 127.5°E)	1200-1100	NE	200	150			Parker et al. 1987 [418]
F18	<u>Musgrave Block-1</u>	c. Australia (26.5°S, 128°E)	1200-1000	ENE	300	200			Parker et al. 1987 [418]
F19	<u>Arunta Block</u>	c. Australia (22°S, 133°E)	1200-1000 ~1350	E	250	50			Parker et al. 1987 [418]
F20	<u>Lakeview</u> (B2 (E4, W3))	nc. Australia (21°S, 140°E)	R 1116±12	NE-E	150?	100?			Ellis & Wyborn 1984 [167] Parker et al. 1987 [418] a: Page 1983 [411]
F21	Alcurra sheets (Kulgera, Victory Downs, Ayers Range)	sc. Australia (25.5°S, 133°E)	S 1090±32	E?	90	10			Camacho et al. 1991 [104] Drexel et al. 1993 (p. 165) [55] a: Zhao & McCulloch 1993 [611]
F22	Stuart	nc. Australia (23°S, 133°E)	S 1076±33	N					Zhao & McCulloch 1993 [611]
F23	<u>Willyama Block-1</u>	s. Australia (32°S, 142°E)	? 1000-570	SE	150?	150?			Parker et al. 1987 [418]

F24	<u>Willyama Block-2</u>	s. Australia (32°S, 140°E)	? 1000-570	SSE	100	180		Parker et al. 1987 [418]
F25	<u>Georgetown Inlier-1</u>	ne. Australia ~(18°S, 144°E)	1000-550	N				Parker et al. 1987 [418]
F26	<u>Georgetown Inlier-2</u>	ne. Australia ~(18°S, 144°E)	1000-550	E				Parker et al. 1987 [418]
F27	<u>Junction</u> (Suite 1)	w. Australia (31°S, 123°E)	1000-570	NE	500	100		Isles & Cooke 1990 [285] Boyd & Tucker 1990 [89]
F28	<u>Yilgarn</u>	w. Australia (32°S, 117°E)	1000-570	NE	1200	800		Parker et al. 1987 [418] Isles & Cooke 1990 [285] Boyd & Tucker 1990 [89]
F29	<u>Gascoyne Province</u>	nw. Australia (23°S, 116°E)	~1000-570	NNE	400	100		Parker et al. 1987 [418] Boyd & Tucker 1990 [89]
F30	<u>Hamersley Basin-2</u>	nw. Australia (21.5°S, 118°E)	~1000-570	ENE	300	150		Parker et al. 1987 [418] Boyd & Tucker 1990 [89]
F31	<u>Wonominta Block-2</u> (D2)	se. Australia ~(31°S, 142°E)	<1000					Zhou & Mills 1990 [613]
F32	<u>Gairdner</u> (Amata) [Gawler A?]	s. Australia (32°S, 137°E)	S ~800	SE-ESE	1000	150		Parker et al. 1987 [418] Zhao et al. 1994 [612] a: Zhao & McCulloch 1993 [611]
F33	<u>Cook</u>	s. Australia (30°S, 130°E)	G ~800?	SE	500			Boyd & Tucker 1990 [89]
F34	<u>Cooe</u>	Tasmania (41.5°S, 145°E)	K 750-700	NNE				Parker et al. 1987 [418]
F35	<u>Adelaide</u>	s. Australia (35°S, 139°E)	~500	SE				Parker et al. 1987 [418] Liu & Fleming 1990 [338] Turner & Foden 1990 [561]
F36	<u>Charters Towers</u>	ne. Australia (20°S, 146.2°E)	~440	SSE, NE				Parker et al. 1987 [418] a: Green & Webb 1974 [224]
F37	<u>Townsville</u>	ne. Australia ~(20°S, 147°E)	A 275-225	SSE-SE	1000	100		Stephenson 1990 [511] Parker et al. 1987 [418] a: Webb & McDougall 1968 [588]
F38	<u>Brisbane</u>	e. Australia (26°S, 152°E)	<230?	ENE	300	1100		Boyd & Tucker 1990 [89]

F39	<u>Duaringa</u> (magnetic anomalies)	e. Australia (24°S, 149°E)	<230?	SSE	300				Boyd & Tucker 1990 [89]
F40	<u>Whitsunday</u>	ne. Australia (20.5°S, 149°E)	≤140						Stephenson 1990 [511]
F41	<u>Sydney Basin-1</u>	se. Australia (33.3°S, 151.5°E)	K 110-90	SE					Maxwell 1990 [357] Parker et al. 1987 [418]
F42	<u>Awatere Valley</u>	New Zealand (42°S, 174°E)	~100-90	NNE, ESE	60	30			Challis 1961 [113]
F43	<u>Sydney Basin-2</u>	se. Australia (33.3°S, 151.5°E)	82-60	NE					Maxwell 1990 [357] Parker et al. 1987 [418]
VERY POORLY DATED SWARMS									
F44	<u>Bardoc</u> (Suite 5)	w. Australia (30.3°S, 121.3°E)		ESE	250	50			Isles & Cooke 1990 [285]
F45	<u>Eucla Basin-1</u>	s. Australia (31°S, 129°E)		SSE	250	200			Boyd & Tucker 1990 [89]
F46	<u>Eucla Basin-2</u>	s. Australia (31°S, 127°E)		NE	200	250			Boyd & Tucker 1990 [89]
F47	<u>McArthur Basin-1</u>	n. Australia (13°S, 133°E)		SW-S (fan)	300	500	50°?	11°S, 135°E	Tucker & Boyd 1987 (p. 167) [558] Boyd & Tucker 1990 [89]
F48	<u>Officer Basin-1</u>	s. Australia (29°S, 130°E)		NNE-NE					Boyd & Tucker 1990 [89]
F49	<u>Pine Creek</u>	n. Australia (13°S, 132°E)		SE	300	150			Parker et al. 1987 [418]

Map Label	Swarm Name	Location	Age (Ma)	Trend	Length (km)	Width (km)	Fan Angle	Focus or Source Direction	Selected References
ANTARCTICA									
G1	<u>Vestfold Hills-1</u>	Antarctica (68.5°S, 78.5°E)	R ~2400	E	20	20			Hoek & Seitz 1995 [272] Hoek 1994 [271]
G2	<u>Napier Complex-1</u>	Antarctica (67°S, 54°E)	R ~2400	SE	150	100			Sheraton et al. 1987 [485]
G3	<u>Vestfold Hills-2</u>	Antarctica (68.5°S, 78.5°E)	U 2241±4 2238±7	NNE-NW	25	10			Hoek & Seitz 1995 [272] Hoek 1994 [271] a: Lanyon et al. 1993 [325]
G4	<u>Vestfold Hills-3</u>	Antarctica (68.5°S, 78.5°E)	U 1754±16	SE	20	30			Hoek & Seitz 1995 [272] Hoek 1994 [271] a: Lanyon et al. 1993 [325]
G5	<u>Commonwealth Bay</u>	Antarctica (67°S, 143°E)	≥1600	SSE					Sheraton et al. 1989 [484] Sheraton et al. 1987 [485]
G6	<u>Vestfold Hills-4</u>	Antarctica (68.5°S, 78.5°E)	U 1380±7	N	3	2			Hoek & Seitz 1995 [272] Hoek 1994 [271] a: Lanyon et al. 1993 [325]
G7	<u>Southern Prince Charles Mts.</u>	Antarctica (74°S, 68°E)	G ~1370	ENE	100	100			Sheraton et al. 1987 [485]
G8	<u>Napier Complex-2</u>	Antarctica (67°S, 54°E)	G ~1370	NNE	150	200			Sheraton et al. 1987 [485]
G9	<u>Vestfold Hills-5</u>	Antarctica (68.5°S, 78.5°E)	U 1248±4 1241±5	18°	3	3			Hoek & Seitz 1995 [272] Hoek 1994 [271] a: Black et al. 1991 [78] a: Lanyon et al. 1993 [325]
G10	<u>Napier Complex-3</u>	Antarctica (67°S, 54°E)	R ~1200	NNE	150	200			Sheraton et al. 1987 [485]

G11	<u>Bunger Hills</u> (several swarms?)	Antarctica (66.2°S, 100.8°E)	R ~1140 G <1150	SE, {E}	20	40			Sheraton et al. 1990 [483]
G12	<u>Mawson Coast</u>	Antarctica (67.5°S, 63°E)	~1000 ≥ 1060						Kuehner 1987 [318] Sheraton et al. 1987 [485]
G13	<u>Windmill Islands</u>	Antarctica (67°S, 110°E)	<1200, ? 500	E					Sheraton et al. 1987 [485] Sheraton et al. 1989 [484]
G14	<u>Heimefrontfjella</u>	Antarctica (75°S, 11°W)	K ~450	N - NE					Sheraton et al. 1987 [485]
G15	<u>Shackleton Range</u>	Antarctica (81°S, 29°W)	K 450-300	NE - E					Sheraton et al. 1987 [485] Brewer et al. 1992 [90]
G16	<u>Mannefall-knausane</u>	Antarctica (75°S, 15°W)	K ~260	NE					Sheraton et al. 1987 [485]
G17	<u>Ahlmannryggen-Borgmassivet</u>	Antarctica (72°S, 005°W)	K ~190	ENE					Sheraton et al. 1987 [485]
G18	<u>West Faukland-1</u>	Antarctica (52°S, 60°W)	K 192±10?	NNE	90	40			Sheraton et al. 1987 [485]
	<u>West Faukland-2</u>	Antarctica (52°S, 60°W)	K 192±10?	ESE	70	30			Sheraton et al. 1987 [485]
G19	<u>Ferrar</u>	Antarctica (85°S, 170°E)	A ~177	SSE, NNE					Elliot 1992 [166] a: Heimann et al. 1994 [262]
	<u>Theron Mts.</u>	Antarctica (79°S, 29°W)	K ~160	NE	50				Sheraton et al. 1987 [485]
G20	<u>South Georgia-1</u>	Antarctica (54.8°S, 36.0°W)	K 150-120	SE	30	20			Sheraton et al. 1987 [485]
	<u>South Georgia-2</u>	Antarctica (54.8S, 36.0W)	<South Georgia-1	NE					Sheraton et al. 1987 [485]
G21	<u>Antarctica Peninsula-1</u>	Antarctica (70°S, 64°W)	K 180-40	NNE-ENE	1500	200			Sheraton et al. 1987 [485]
G22	<u>South Orkneys</u>	Antarctica (60.5°S, 45°W)	K ~90	N, E					Sheraton et al. 1987 [485]

G23	<u>Antarctica Peninsula-2</u>	Antarctica (72°S, 62°W)	K <40	E-SE, {N}	200	1000			Sheraton et al. 1987 [485]
G24	<u>James Ross Island</u>	Antarctica (64°S, 58°W)	K ~7-1	E					Sheraton et al. 1987 [485]
VERY POORLY DATED SWARMS									
G25	<u>Schirmacher Hills</u> (several swarms)	Antarctica (70.8°S, 11.7°E)		deformed					Sengupta 1993 [481]

Table 2: Mantle Plume Centres Interpreted from Converging Swarms

The headings in Tables 2 are explained as follows:

Map Label: Plume centres labelled in order of decreasing age. A question mark preceding the label indicates that the interpretation of a mantle plume is uncertain. Where different components of the swarm are on separate continents, the location of the plume relative to each block is given and an additional letter indicates the continent (a= North America, b= South America, c= Europe, d= Asia, e= Africa, f= Australia & g= Antarctica).

Name of Event (Approximate Location of Plume Centre): Assigned magmatic event name and plume centre location determined from the geometry of the dyke swarm.

Approximate Maximum Distance from Focus: The distance measured from the plume centre to the most distal portion of the radiating pattern. This number can be very uncertain given the very large uncertainties in the identification of plume centres.

Overall Fan Angle: The angle subtended by the reconstructed radiating pattern.

Component Swarms: The component swarm names and labels are keyed both to the map and Table 1.

Age: Ages from Table 1.

Dyke Criteria for Identifying Plume Centre: Description of criteria used to define plume centres based on dyke swarms. Other criteria can be found in the references.

Related Volcanic and Intrusive Units: Important volcanic and intrusive units which have similar age to the dykes and are probably related.

References: Selected references.

Each of the plume centres listed herein is described in more detail in Ernst and Buchan subm. [181].

Map Label	Name of Event (Approximate Location of Plume Centre)	Approximate Maximum Distance From Focus	Overall Fan Angle	Component Swarms	Age of Dyke Magmatism (Ga)	Dyke Criteria for Identifying Plume Centre	Related Volcanic & Intrusive Units (near focal region except where noted)	Reference for Identification of Plume (or triple junction)
P1	Mistassini (50°N, 71°W)	700	35°	Mistassini (A8)	2.47	fanning of A8		Fahrig et al. 1986 [193]
P2	Matachewan (45°N, 81°W)	1000	40°	Matachewan (A9)	2.49-2.44	fanning of A9	Thessalon & Dollyberry volcanism; plutons	Fahrig 1987 [191] West & Ernst 1991 [590] Bates & Halls 1991 [47] Ernst et al. 1995 [183]
P3	Ungava Bay (58°N, 66°W)	1400	80°	Klotz (A15) Maguire (A16) Senneterre (A17)	~2.2	convergence of A15-A17	Nipissing sills (distal from focus)	Buchan et al. in prep. [96]
P4	Fort Frances (45°N, 91°W)	~800	35°	Fort Frances (A26)	~2.08	fanning of A26		Southwick & Day 1983 [501]
P5	Mackenzie (71°N, 116°W)	2600	100°	Mackenzie (A64)	1.269-1.265	fanning of A64	Coppermine volcanism Muskox Intrusion; Christie Bay and other sills (distal from focus)	Fahrig 1987 [191] LeCheminant & Heaman 1991 [330]
P6	Sudbury ~ (45°N, 75°W)	>300	~0	Sudbury (A65)	1.242-1.232	flow direction in A65		Fahrig 1987 [191] Ernst 1994 [178]
P7	Abitibi (45.5°N, 87.5°W)	1200	20°	Abitibi (A67)	1.142-1.140	fanning of A67	Keweenawan Rift volcanism & intrusions ¹	Fahrig 1987 [191] Ernst et al. 1995 [183]
?P8	Tanzania (1°S, 33°E)	1000-1500	100°	Tanzania-3 (E41) Tanzania-4 (E42) Tanzania-5 (E43)	1.1-0.7	convergence of E41-E43		Halls et al. 1987 [238]
P9	Kola-Onega (71°N, 38°E)	850	50°	Kola-Onega (C41)	~1.0	fanning of C41		Ernst et al. 1995 [182]
P10	Coastline (Bahia) (14.9°S, 38.3°)	200	80°	Ilhéus-Oliveira-Camacã (B26) Itacaré (B27) Salvador (B28)	~1.0	convergence of B26-B28		Correa-Gomes 1995 [135] Gomes et al. 1989 [218]

P11	Willouran	2800	200°	see P10a & P10f		convergence of A75-A77 & F32		Park et al. 1995 [414]
--P11a	--N. America portion (50°N, 130°W)	2800	110°	Gunbarrel (A75-A77)	0.780	convergence of A75-A77		Park et al. 1995 [414]
--P11f	--Australia portion (32°S, 138°E)	>1000	0°	Gairdner (F32)	~0.80		Willouran volcanism	Zhao et al. 1994 [612]
P12	Natkusiak (Franklin, Thule) (75°N, 120°W)	2200	110°	Franklin (A81) Thule (A82)	0.727-0.721	fanning of A81	Natkusiak volcanism; Coronation sills; Minto Inlier sills; Steensby Land sills	Heaman et al. 1992 [259] Rainbird 1993 [452] Ernst & Buchan subm. [181]
?P13	Gannakouriep (30°S, 17°E)	250	25°	Gannakouriep (E44)	~0.72	fanning of E33		Ernst et al. 1995 [182]
P14	Central Iapetus (45°N, 71°W)	2200	170°	Long Range (A83) Grenville (A84) Adirondack (A85) Southern PRT (A86-A91)	~0.60	convergence of A83, A84, A85 & A86-A91	Tibbit Hill volcanism ²	St. Seymour & Kumarapeli 1995 [509] Kumarapeli 1993 [319] Ernst & Buchan subm. [181]
P15	Yakutsk (66°N, 132°E)	1400	150°	Yakutsk (D37-D40)	~0.35	convergence of D37-D40		Shpount & Oleinikov 1987 [486] Ernst et al. 1995 [182]
P16	Skagerrak (57.5°N, 8.5°E)	1000	230°	Whin-Midland Valley (C66) Oslo (C67) Scania (C68)	0.30	convergence of C66-D68	Oslo rift volcanism; Whin & Midland Valley sills (distal from focus)	Ernst & Buchan subm. [181]
P17	Siberian Traps (72.5°N, 96°E)	600	30°	Ebekhaya (D42) Maymecha (D43)	0.250	convergence of D42 & D43	Siberian Trap volcanism, plutons & sills	Ernst & Buchan subm. [181]
P18	Central Atlantic (Fernando de Noronha plume)	2800	240°	see P15a, P15b, and P15e		convergence of A99, B38-B47 & E51-E52 after reconstruction		May 1971 [358] Hill 1991 [270] Oliveira et al. 1990 [406]

--P18a	--N. America portion (31°N, 78°W)	2800	90°	ENA (A99)	0.202-0.198	fanning of A99		May 1971 [358] Hill 1991 [270]
--P18b	--S. America portion (10°N, 55°W)	2500	70°	Apatoe (B38) Amapa, Jari (B39,B40) Cerro Bolivar (B41) Supenaam (B42) Rio Trombetas (B45) Tukutu River (B46) Óbidos-Mapuero (B47)	~0.20	convergence of B38-B47		May 1971 [358] Oliveira et al. 1990 [406]
--P18e	--African portion (18°N, 20°W)	2600	90°	Liberian (E51) Moroccan (E52)	~0.20	convergence of E51-E52		May 1971 [358]
P19	Karoo-1 (Marion? plume) (22°S, 31°E)	1500	120°	Botswana (E55) Orange River Fracture Zone (E56) Lebombo (E57)	~0.18	convergence of E55-E57	Karoo volcanism & intrusions	Windley 1977 (Fig. 14.6) [599] Ernst & Buchan subm. [181] Mubu 1995 [376] White & McKenzie 1989 [592]
P20	Paraná- Etendeka (Tristan da Cunha plume)	1500	~210°			convergence of B54-B58 and E68-E69 after reconstruction		White 1992 [591] Ernst et al. 1995 [182] White & McKenzie 1989 [592]
--P20b	--South America Portion ~(26°S, 47°W)	1500	~210°	Paraguay (B54) West Bodoquena (B55) Ponta Grossa (B56) Santos-Rio de Janeiro (B57) Florianópolis (B58)	0.130	convergence of B54-B58	Paraná volcanism & intrusions	White 1992 [591] Ernst et al. 1995 [182] White & McKenzie 1989 [592]
--P20e	--African Portion (19°S, 13°E)			Horingbaai-1 (E68) Etendeka (E69)	0.130		Etendeka volcanism	White & McKenzie 1989 [592]
P21	Alpha Ridge (82°N, 93°W)	850	90°	Hazen Strait (A103) Lightfoot River (A104)	~0.10	convergence of A103-A104	Strand Fiord volcanism; sills	Embry & Osadetz 1988 [168] Ernst & Buchan subm. [181]
P22	Madagascar (24.4°S, 47.3°E)	1100	90°	Madagascar (E72)	0.088	fanning of E72	Madagascar volcanism	Storey et al. 1995 [518] Ernst & Buchan subm. [181]

P23	Deccan (Réunion plume) (21°N, 74°E)	1100	270°	Narmada-Tapti-Son (D57) Panvel (D58) Mt. Girnar (D59) Cambay (D60)	0.065	convergence of D57-D60	Deccan volcanism & intrusions	White 1992 [591] Ernst & Buchan subm. [181] White & McKenzie 1989 [592]
P24	North Atlantic Tertiary (Iceland plume)	1250	260°	see P19a & P19c		convergence of A109 & C74 after reconstruction		White 1992 [591] Ernst et al. 1995 [182] White & McKenzie 1989 [592] Coffin & Eldholm 1994 [127]
--P24a	--Greenland portion (68°N, 33°W)	900	180°	E. Greenland Tertiary (A109)	~0.060		E. Greenland volcanism and intrusions; Disko Island volcanism	
--P24c	--UK portion (58°N, 19°W)	1250	0°	British Tertiary (C74)	~0.060		British Tertiary volcanism and intrusions	
P25	Columbia River (Yellowstone plume) ~(42°N, 117°W)	600	~40° (195° with A107)	Chief Joseph (A111) Monument Valley (A112) Cascade Range (A113) Nevada rift (A115)	0.017-0.014	convergence of A111-A113 & A115	Columbia River volcanism & intrusions	Parsons 1994 [419] Ernst & Buchan subm. [181] Zoback et al. 1994 [616]
P26	Afar (12°N, 44°E)	2050	~100°	Red Sea (D64) Afar (E75)	~0.020		Ethiopian & Yemeni volcanism & intrusions	Mohr & Zanettin 1988 [368] White & McKenzie 1989 [592]
VERY POORLY DATED EVENT								
?P27	McArthur Basin (11°S, 135°E)	400	50°	McArthur Basin-1 (F47)		fanning of F47		Tucker & Boyd 1987 [558]

¹Keweenaw volcanic and intrusive rocks are located in the focal region of the Abitibi swarm but are 30 - 55 Ma younger (e.g. Paces & Miller 1993 [410]).

²Tibbit Hill volcanic rocks are located in the focal region of the Central Iapetus swarm but are 45 Ma younger (Kumarapeli et al. 1989 [320]).

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