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Publications in this series have not been edited; they are released as submitted by the author.

INTRODUCTION

The M6.4 and M6.3 Ahar (Iran) earthquakes occurred at 12:23 (UTC) with epicenter located at 38.322°N, 46.888°E and 12.34 (UTC) with epicenter located at 38.3237°N, 46.7588°E on 11 August 2012 with a focal depth of 9 km. [Earthquake.usgs.gov].

Differential interferograms presented here were calculated from RADARSAT-2 Synthetic Aperture Radar (SAR) data using Differential Interferometric Synthetic Aperture Radar (DInSAR) methodology. The processing was performed with GAMMA software [Wegmüller and Werner, 1997] and consisted of the following steps: slave to master image coregistration and resampling; interferogram calculation and removal of the topographic phase reconstructed from the 30 m ASTER DEM [Gdex.cr.usgs.gov], orbital correction, adaptive filtering [Goldstein and Werner, 1998]; phase unwrapping [Costantini, 1998]; and geocoding. Due to densely vegetated ground conditions interferometric coherence is low.

Table 1: SAR data used in the study: beam mode, time span in format YYYYMMDD, perpendicular baseline, azimuth (Θ) and incidence angle (Φ).

Beam	Time span	Side looking	Perp. Base. [m]	Θ [°]	Φ [°]
Multi-Look Fine 5 (MF5)	20120413–20120904	right	-95	350	47
Multi-Look Fine 6 (MF6)	20120313–20120828	right	-157	351	49

Differential interferograms were calculated from the Multi-Look Fine 5 (MF5) and Multi-Look Fine 6 (MF6) beam modes (Tab. 1, Figs 1, 3). Final products, unwrapped geocoded interferograms (Figs 2, 4,) are provided in GMT grid format and are measured in centimeters (.grd files). By definition, motion away from the satellite in the line-of-sight (LOS lengthening) is negative and motion towards the satellite (LOS shortening) is positive. Supplementary data include Google Earth kml files of the unwrapped interferograms (re-wrapped for visualization) similar to Figs 1, 3 and also SAR look-vector elevation angle (lv_theta) and SAR look-vector orientation angle (lv_phi) files measured in radians. The elevation angle ranges from pi/2=UP to -pi/2=DOWN and the orientation vector ranges from 0=EAST to pi/2=NORTH. These values can be used for calculating a LOS unit vector pointing from the ground to the satellite [Samsonov and d'Oreye, 2012] using the following equations:

S_north = cos(lv_theta)*sin(lv_phi)

S_east = cos(lv_theta)*cos(lv_phi)

S_up = sin(lv_theta)

The interferograms provided here can be used for geophysical modeling and inversion.

References:

Costantini, M., 1998. A novel phase unwrapping method based on network programming IEEE Transactions on Geoscience and Remote Sensing, 36, 813–821

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Goldstein, R. and Werner, C., 1998. Radar interferogram filtering for geophysical applications, Geophysical Research Letters, 25, 4035–4038, 1998

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Wegmüller, U. and Werner, C., 1997. Gamma SAR processor and interferometry software,

in: The 3rd ERS Symposium on Space at the Service of our Environment, Florence, Italy, 1997, 1687–1692

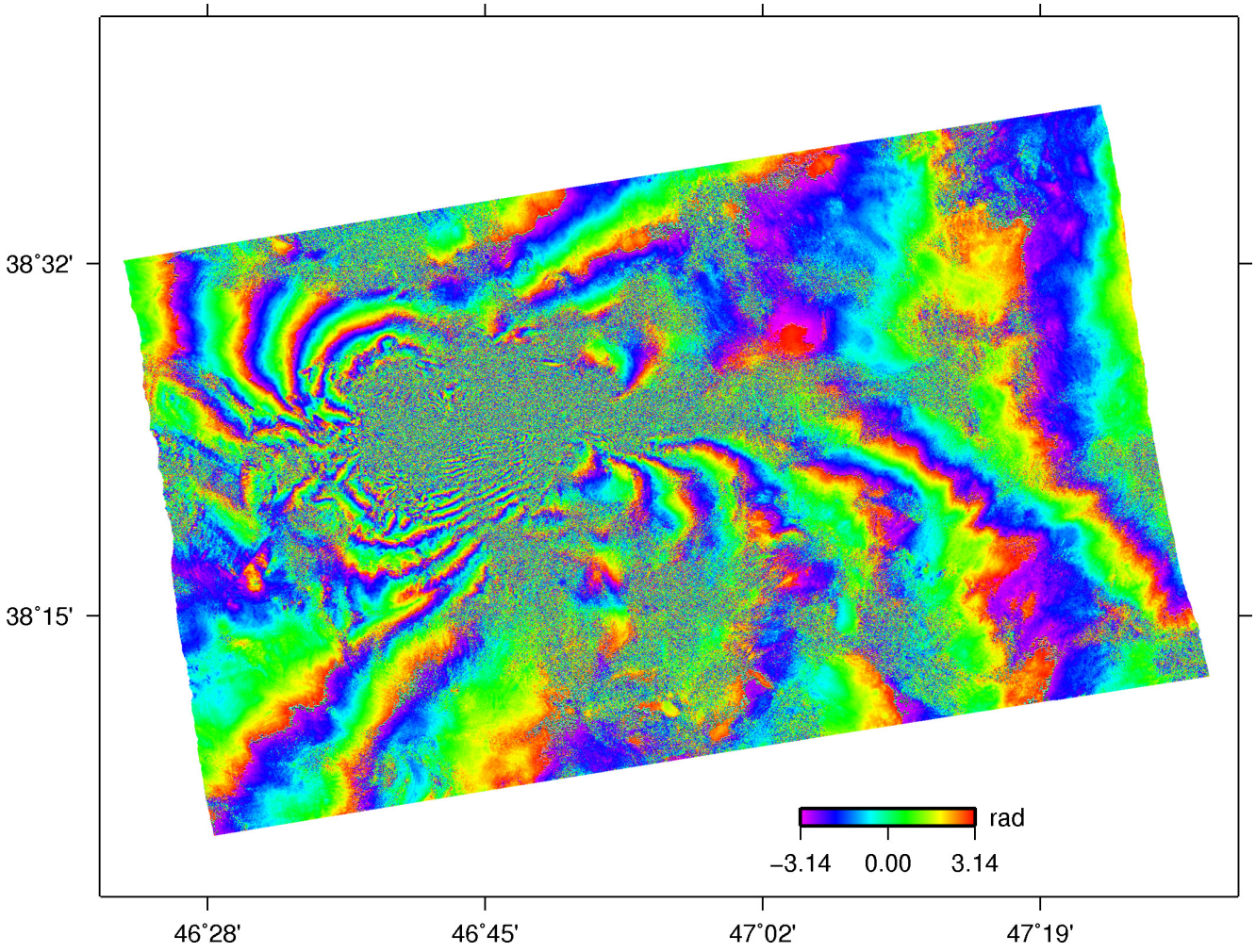

Figure 1: Filtered wrapped differential interferogram calculated from two RADARSAT-2 MF5 images acquired on 20120413–20120904 from ascending orbit, right looking geometry. Perpendicular baseline is -95 m.

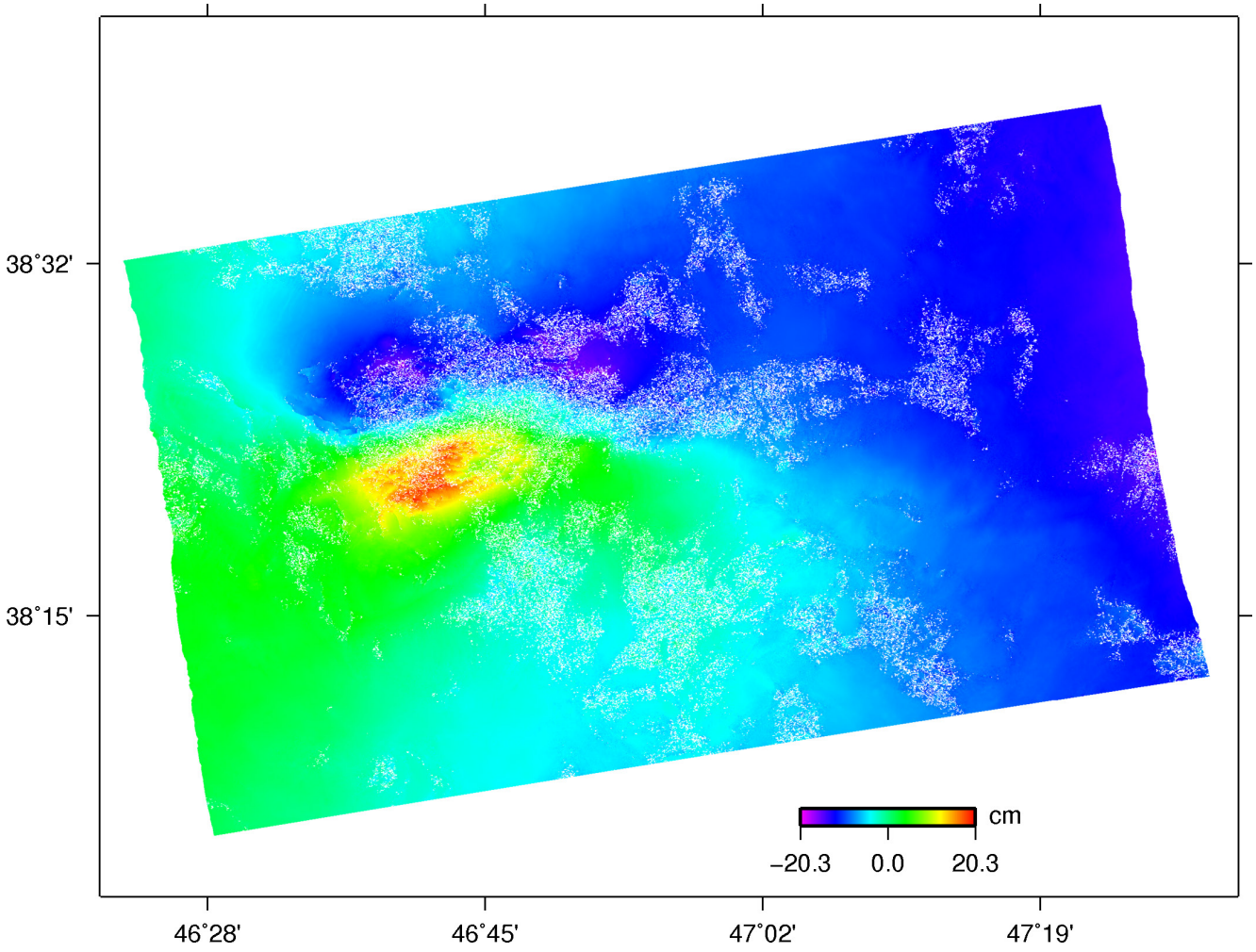

Figure 2: Unwrapped differential interferogram calculated from two RADARSAT-2 MF5 images acquired on 20120413–20120904 from ascending orbit, right looking geometry. Perpendicular baseline is -95 m. This data is provided in GMT grid file format.

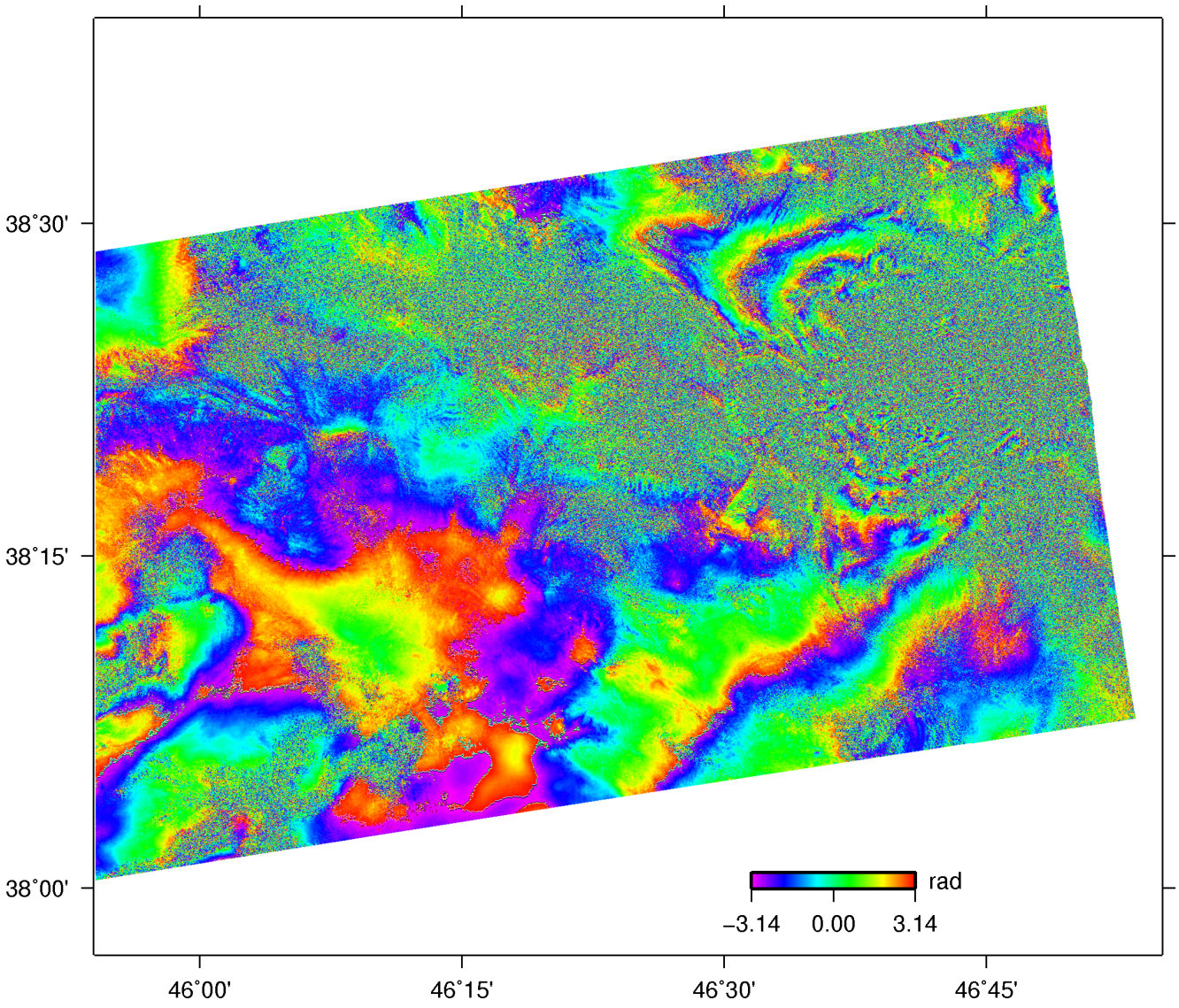

Figure 3: Filtered wrapped differential interferogram calculated from two RADARSAT-2 MF6 images acquired on 20120313–20120828 from ascending orbit, right looking geometry. Perpendicular baseline is -157 m.

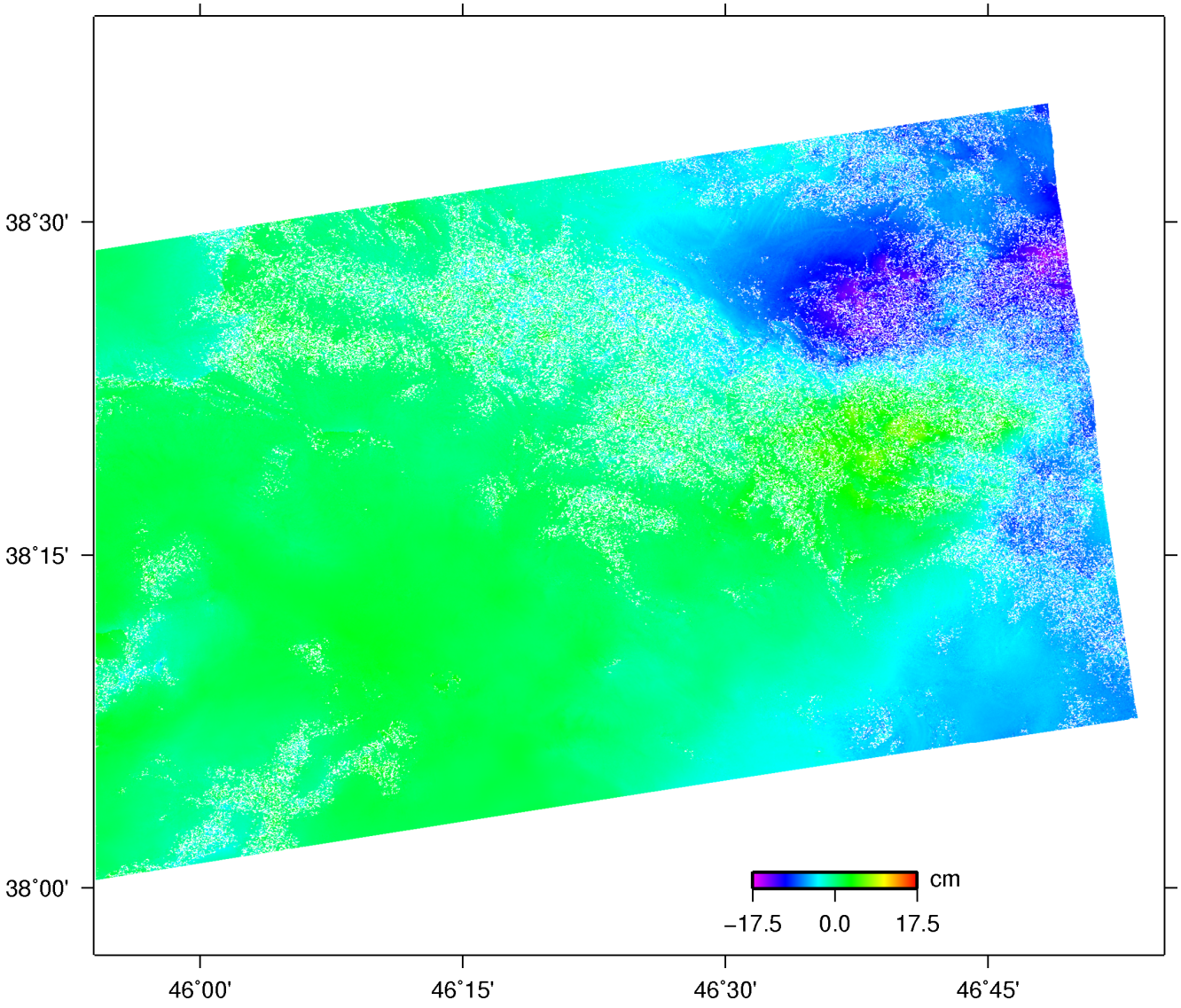

Figure 4: Unwrapped differential interferogram calculated from two RADARSAT-2 MF6 images acquired on 20120313–20120828 from ascending orbit, right looking geometry. Perpendicular baseline is -157 m. This data is provided in GMT grid file format.

Data folder names are in the following format SATELLITE-BEAM:

RADARSAT2 _MF5

RADARSAT2_MF6

Description of files:

*.rmli.par.txt – parameter file of master image describing satellite, beam and processing parameters

*.adf.diff.png – wrapped filtered interferogram

*.adf.unw.png – unwrapped filtered interferogram

*adf.unw.geo.png and *adf.unw.geo.kml – Google Earth kml files (unwrapped interferogram re-wrapped for visualization)

*adf.unw.grd – GMT (the Generic Mapping Tool) grid file of unwrapped filtered interferogram (final product)

bperp.txt – interferogram baseline information file

lv_theta.png – SAR look-vector elevation angle

lv_theta.grd – GMT grid file of SAR look-vector elevation angle

lv_phi.png – SAR look-vector orientation angle

lv_phi.grd – GMT grid file of SAR look-vector orientation angle

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