Rapid Building Damage Maps from COSMO-SkyMed SAR Data of M6.2 Aug 24, 2016 Amatrice Earthquake and M6.6 Oct 30, 2016 Norcia Earthquake

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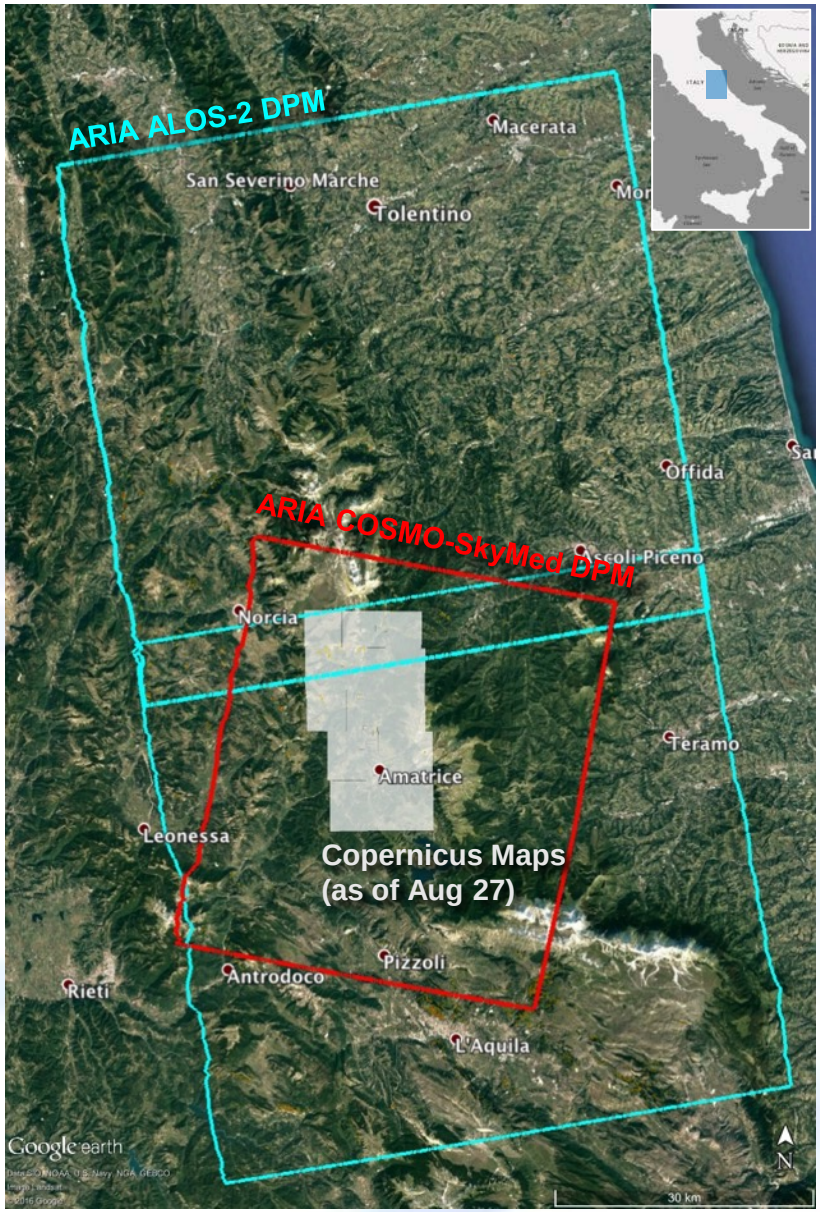
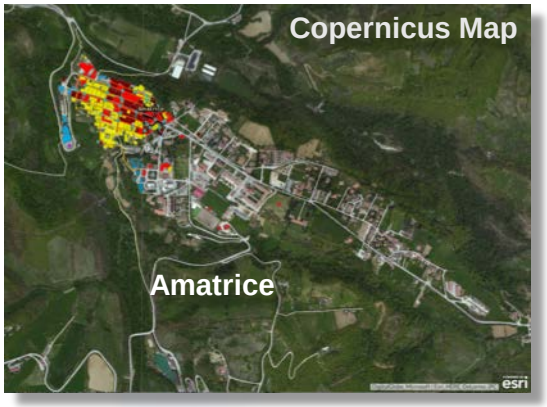
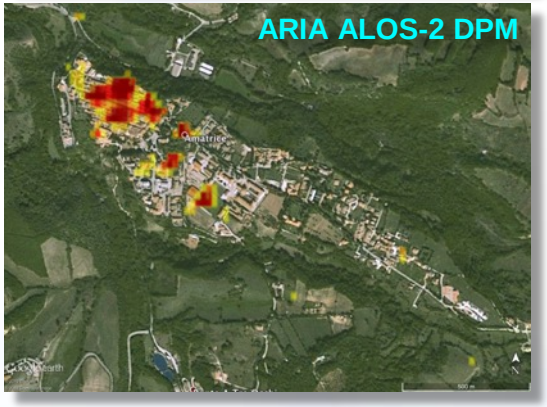
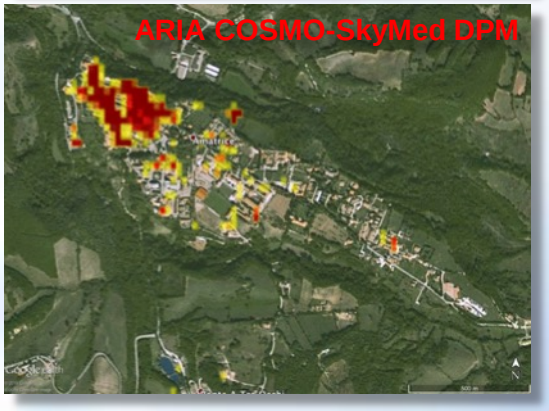
M6.2 Aug 24, 2016 Amatrice Earthquake

Damage Proxy Maps of Central Italy Created from JAXA's ALOS-2 and ASI's COSMO-SkyMed SAR Data









Damage Proxy Maps (DPMs) can improve situational awareness at early stage of response, providing cloud-free internally consistent synoptic view of large area.

DPM derived from ALOS-2 (Aug 24) and COSMO-SkyMed SAR Data (Aug 28)

Coverage: 65 km x 120 km (ALOS-2), 40 km x 50 km (COSMO-SkyMed)

Pixel size : 30 m x 30 m

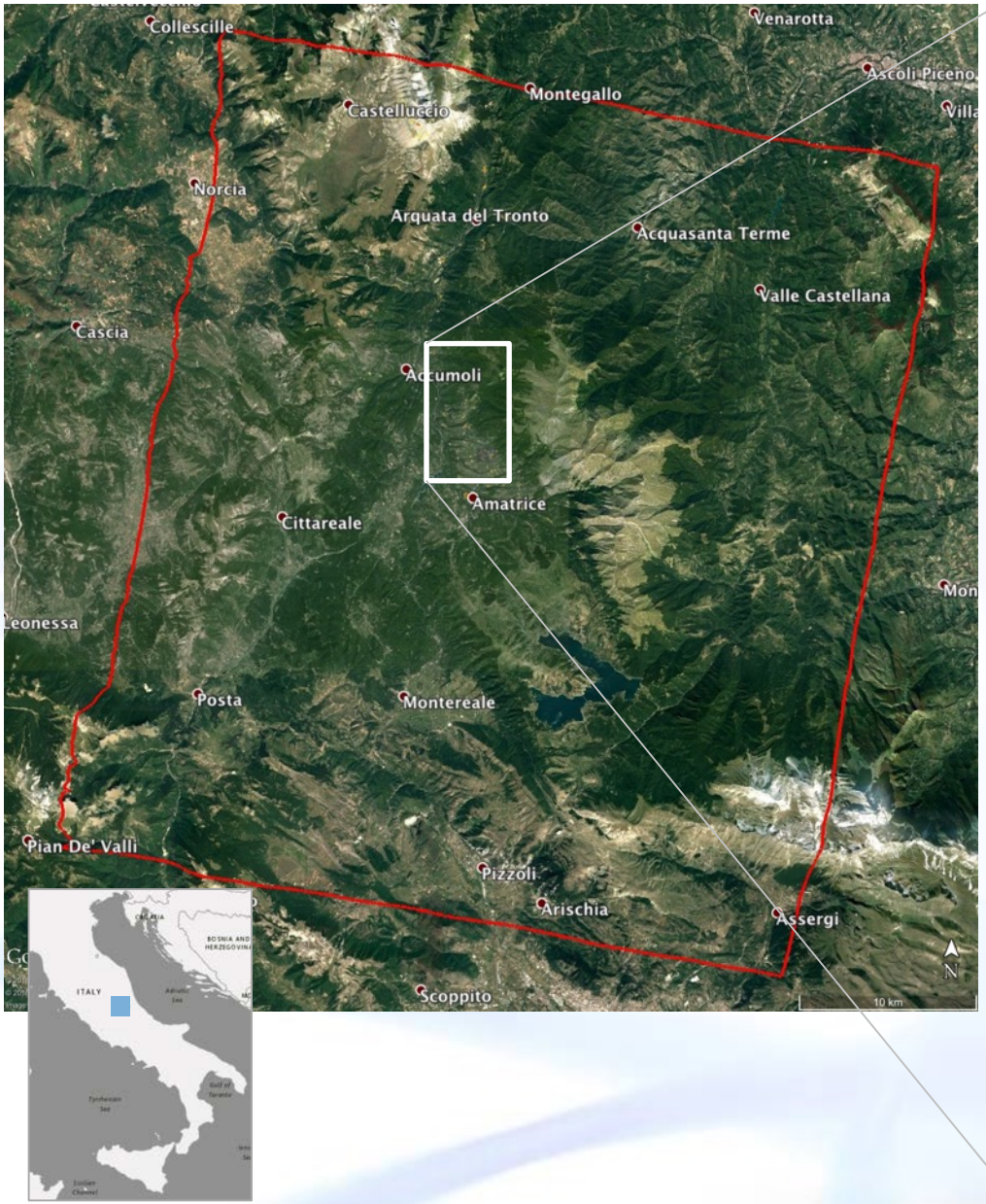
Calibrated with Copernicus damage map based on visual inspection of high-res optical imagery

High correlation with optical imagery elsewhere and ground observations

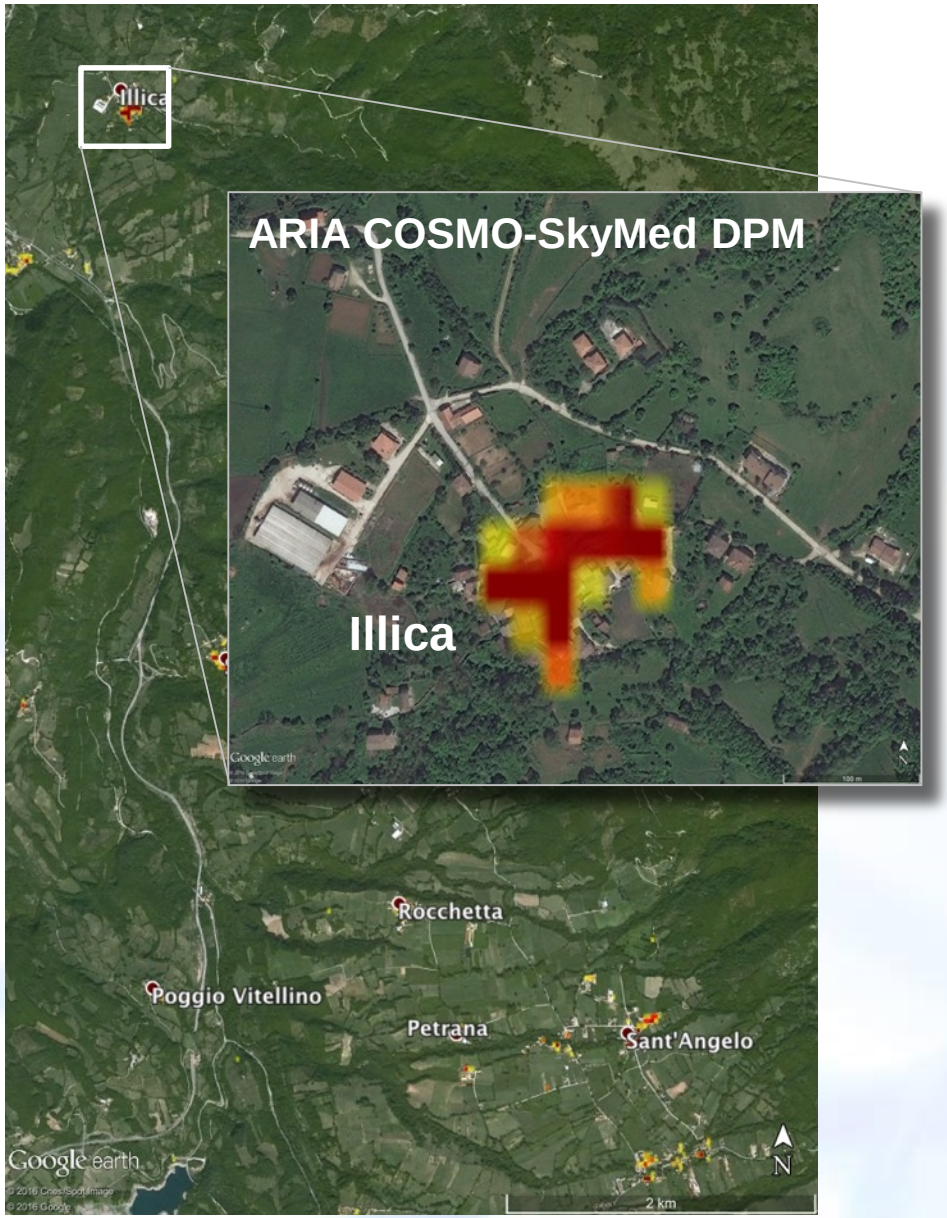
Product formats: KMZ, GeoTiff

Product URL
http://aria-share.jpl.nasa.gov//events/20160824-Italy_EQ/DPM/

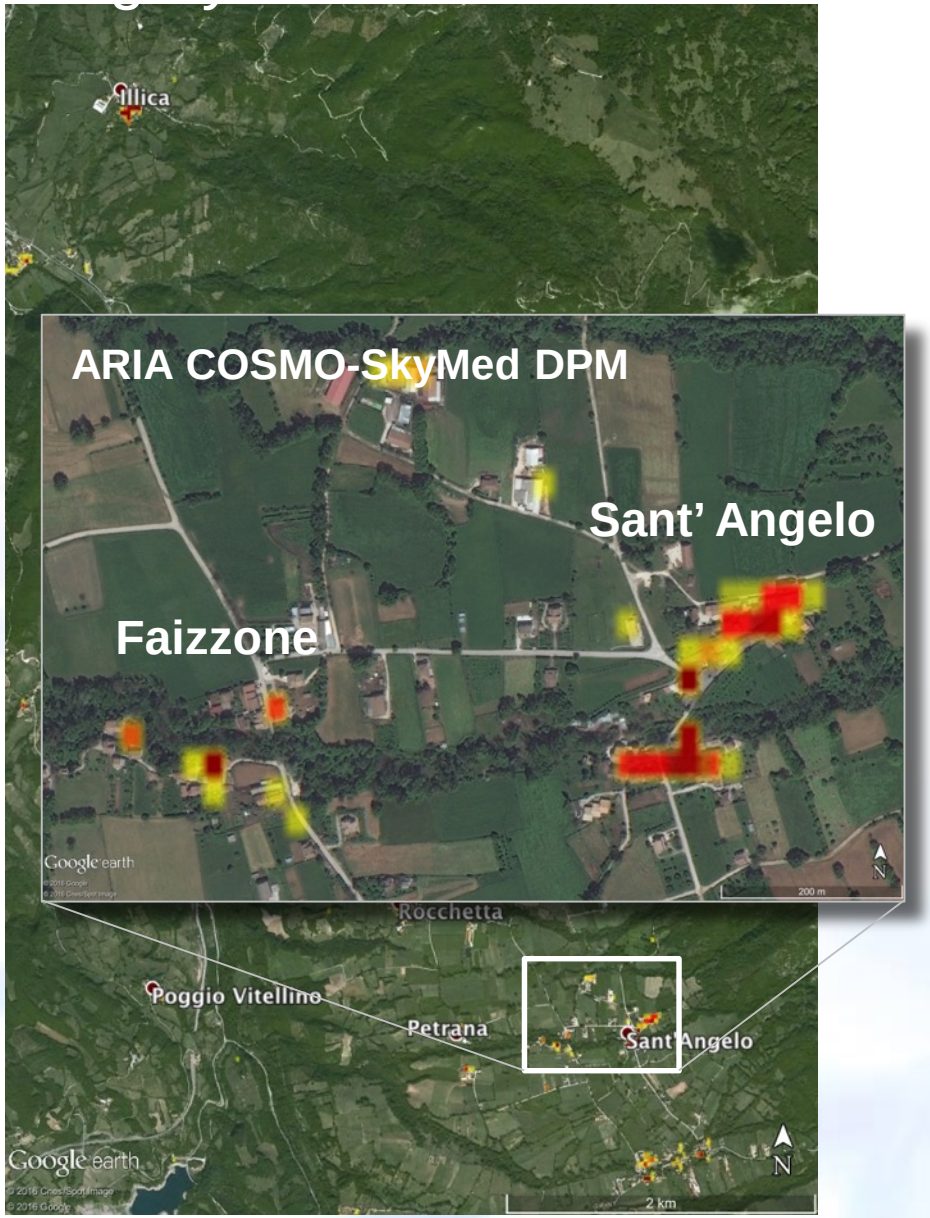
Damage Proxy Maps from Radar Satellites Reveal Small Scale Details over Large Area.



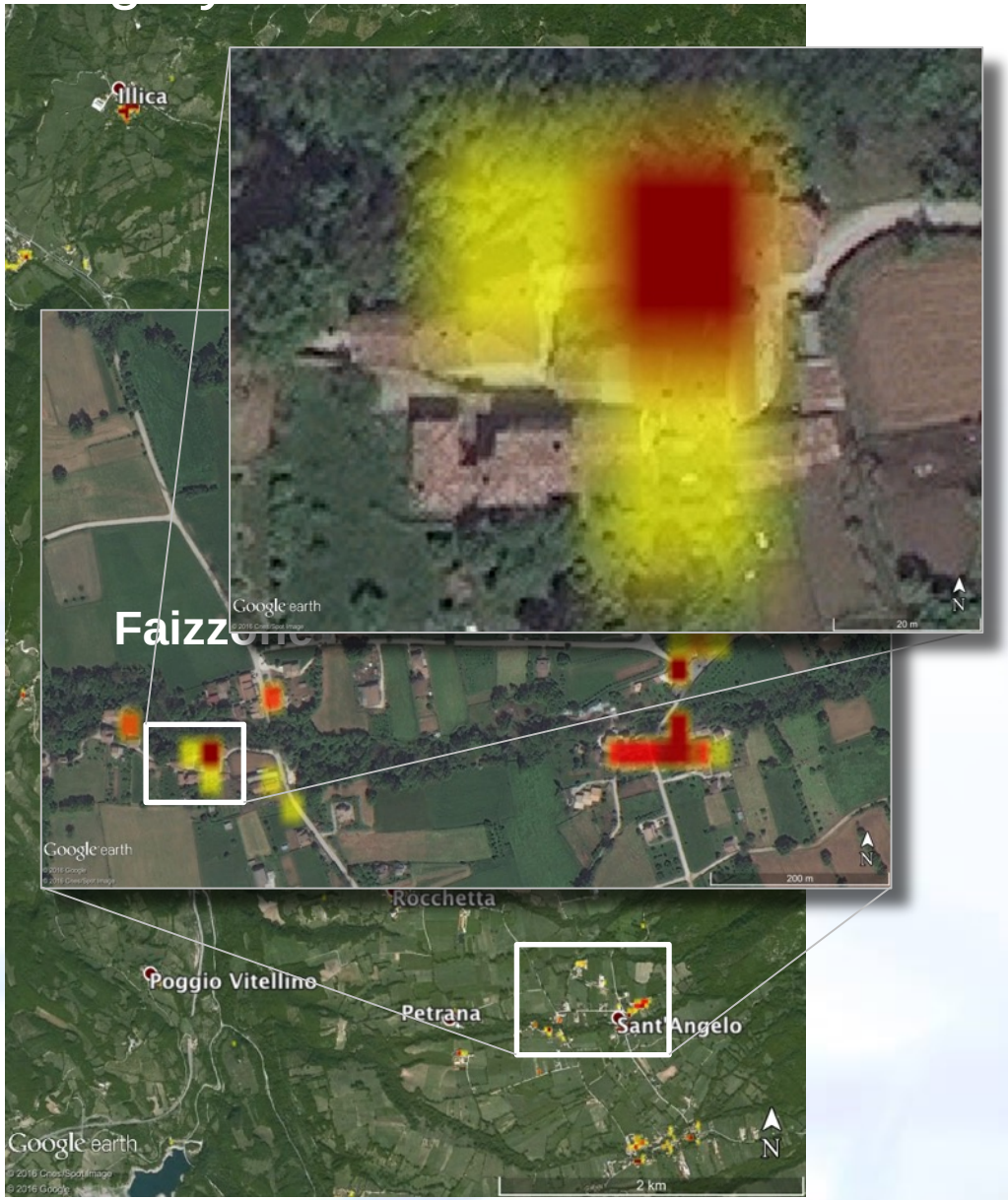
Damage Proxy Map Showing Correlation with Optical Imagery



Damage Proxy Map Showing Correlation with Optical Imagery

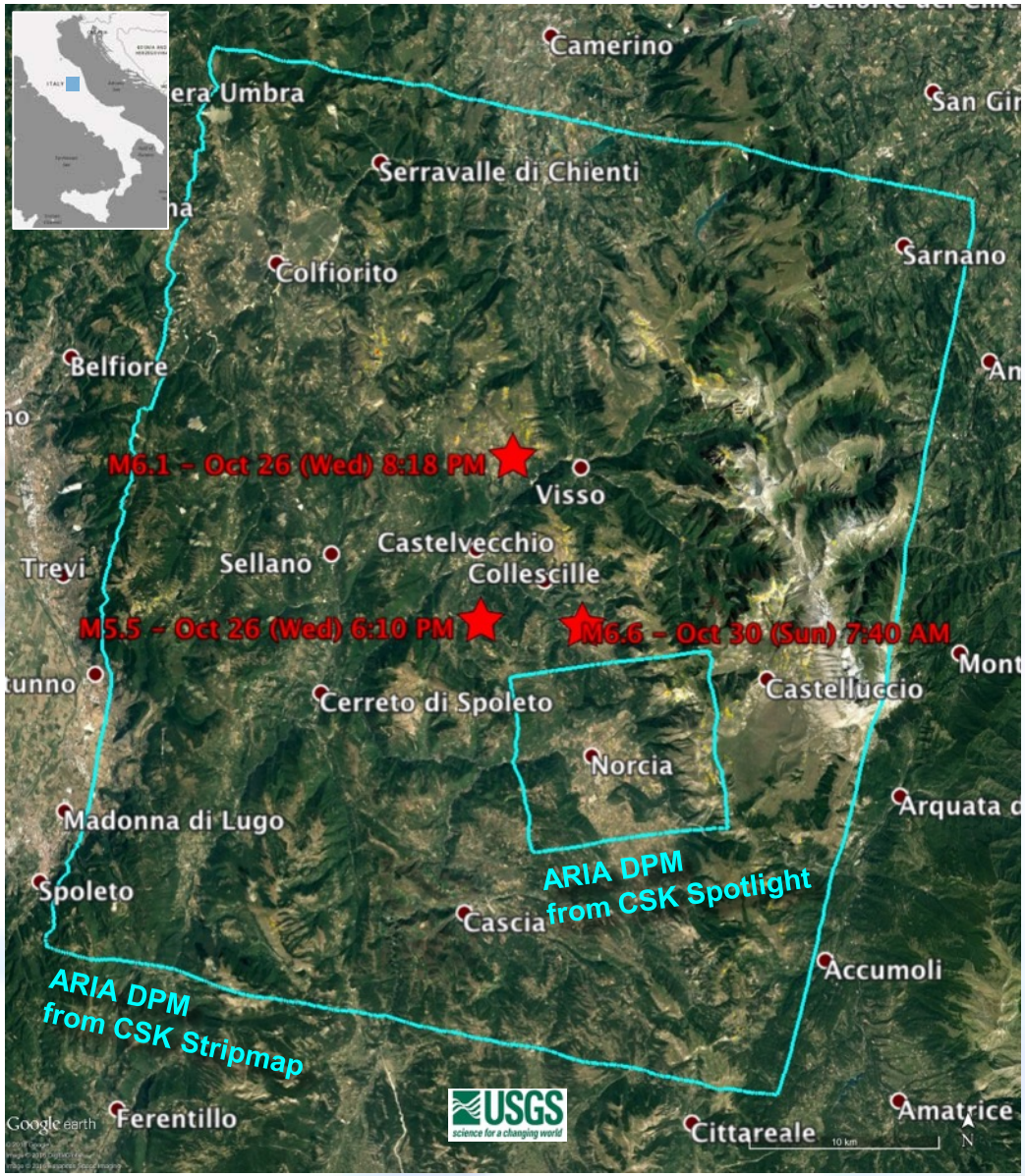


Damage Proxy Map Showing Correlation with Optical Imagery



M6.6 Oct 30, 2016 Norcia Earthquake

NASA Helps Finding Damaged Buildings using Satellite Radar Data



NASA's JPL Produced Damage Proxy Map (DPM) derived from Synthetic Aperture Radar (SAR) data acquired from Italian Space Agency's (ASI's) COSMO-SkyMed satellites.

DPM (SAR data acquired on Oct 27) of Oct 26 M5.5 and M6.1 earthquakes covers 40-by-50 km (large cyan box) at 30 m resolution. DPM (SAR data acquired on Oct 31) of Oct 30 M6.6 earthquake covers 10-by-10 km (small cyan box) at 5 m resolution.

Preliminary validation by comparing with high-resolution pre- and post-event optical imagery acquired by DigitalGlobe's WorldView satellites, and a damage map produced by the European Commission Copernicus Emergency Management Service based upon visual inspection of high-resolution pre- and post-event optical imagery.

Delivered to ASI, Italian Civil Protection, Italian Embassy, and US State Department.

Available at: http://aria-share.jpl.nasa.gov//events/20161030-Italy_EQ/DPM

Satellite Radar Data Reveals Damage in Norcia, Italy

ARIA DPM

Copernicus

Red pixels in ARIA DPM (pixel size about 5 m, overlaid on Google Earth) represent areas of potential damage due to the M6.6 Oct 30, 2016 Central Italy Earthquakes, as well as ground surface change during the time period Oct 30, 2016 -- Oct 31, 2016.

The color variation from yellow to red indicates increasingly more significant ground surface change.

BEFORE (WorldView)

AFTER (WorldView)

Photo Courtesy: Matteo Guidelli / AP

Small Scale Damage can be Detected by Radar

ARIA DPM

Copernicus

BEFORE (WorldView)

AFTER (WorldView)

ARIA DPM was derived from COSMO-SkyMed radar data acquired on Oct 30 and Oct 31, 2016 (1-day apart). Pixel size is about 5 m. High-resolution SAR data are sensitive to small scale damage.

Copernicus damage map (polygons) based on visual inspection of high-resolution pre- (2014) and post-event (Oct 31, 2016) optical imagery. This map misinterpreted the roof construction as earthquake damage. Also the map failed to identify the small scale building damage (indicated with a red arrow).

WorldView optical satellite images were acquired on Sep 4 and Oct 31, 2016.

Small Scale Damage can be Detected by Radar

ARIA DPM

Copernicus (failed to identify damage)

BEFORE (WorldView)

AFTER (WorldView)

ARIA DPM was derived from COSMO-SkyMed radar data acquired on Oct 30 and Oct 31, 2016 (1-day apart). Pixel size is about 5 m. High-resolution SAR data are sensitive to small scale damage.

Copernicus damage map (polygons) based on visual inspection of high-resolution pre- (2014) and post-event (Oct 31, 2016) optical imagery. This map failed to identify the roof damage of the building.

WorldView optical satellite images were acquired on Sep 4 and Oct 31, 2016.