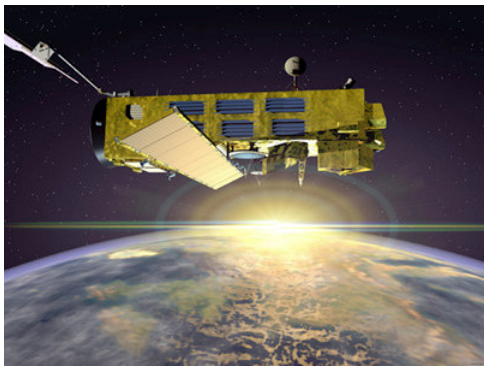
Measuring Ground Motion from Space

Neva Ridge Technologies employs satellite technology to measure, monitor, and map ground motion arising from a variety of sources. The successful application of this technology has been demonstrated in mapping subsidence due to material withdrawal, uplift due to injection, and landslide activity.

The basic technology is called differential interferometric synthetic radar, or DifSAR. It has matured in the earth science community over the past 15 years where it can be found as a tool for measuring surface motion in fields such as volcanology, seismology, glaciology, and hydrology.

Neva Ridge Technologies serves the geotechnical community by procuring and processing the satellite data, delivering derived measurements, and helping with interpretation and presentation.

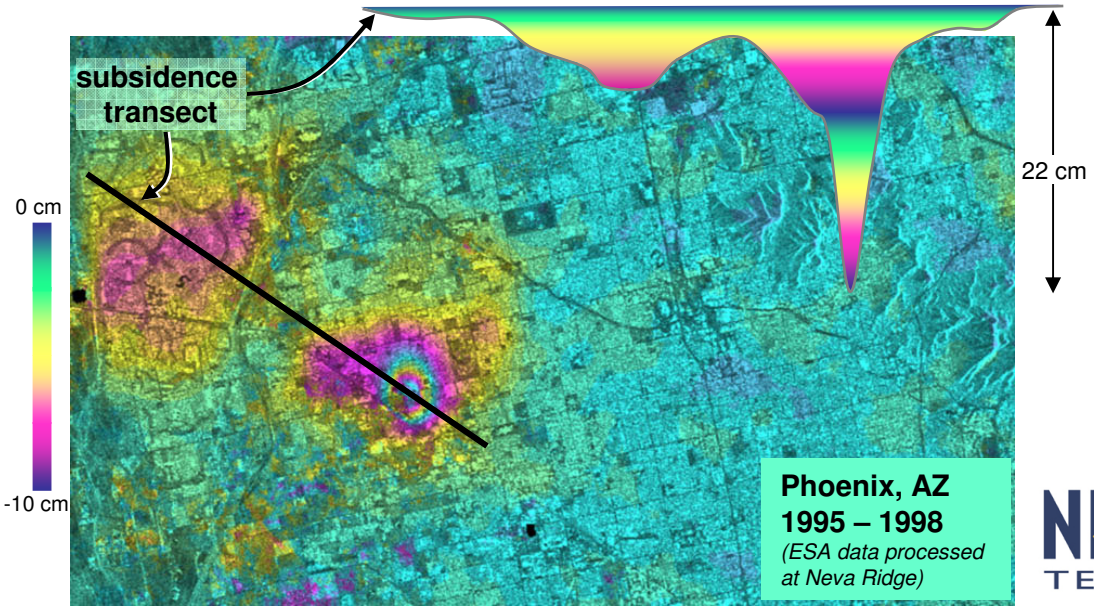


Artist's Conception of Envisat (courtesy European Space Agency)

Characteristics and Advantages of DifSAR for Ground Motion Measurement

- High measurement accuracy. Depending on environmental conditions, ground motion accuracy can be on the order of less than a centimeter.
- High measurement density. Ground motion measurements are computed on a grid with 10 – 50 meter spacing.
- Large area extent. A single satellite acquisition covers more that 3000 square miles.
- Forensic archive. For many locations around the world, archived raw data are available. From these data, historical motion measurements dating from 1992 to the present can be derived.
- Operational monitoring. Measurements may be obtained as often as every 24 days.

The image below shows a ground motion result for the Phoenix Arizona area. In the Phoenix valley, large historical ground subsidence is thought to be a result of over-pumping of aquifers during the past century. This DifSAR-derived subsidence measurement is shown in a colored contour representation. It is overlaid on an "image" derived from the radar sensor, which bears a resemblance to a b&w image but is technically different. The most prominent feature represents a subsidence of about 22 cm during the 33-month period.



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