

Gulf Coast Subsidence: Mapping and Measurement with InSAR

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Louisiana is Sinking. To understand it, you have to measure it!

Deep Processes:

- Sediment and water load induced flexure of the lithosphere: constant 0 to -7mm/yr
- Faulting: variable up to -40mm/yr
- Salt evacuation: variable 0 to -?? mm/yr

Shallow Processes:

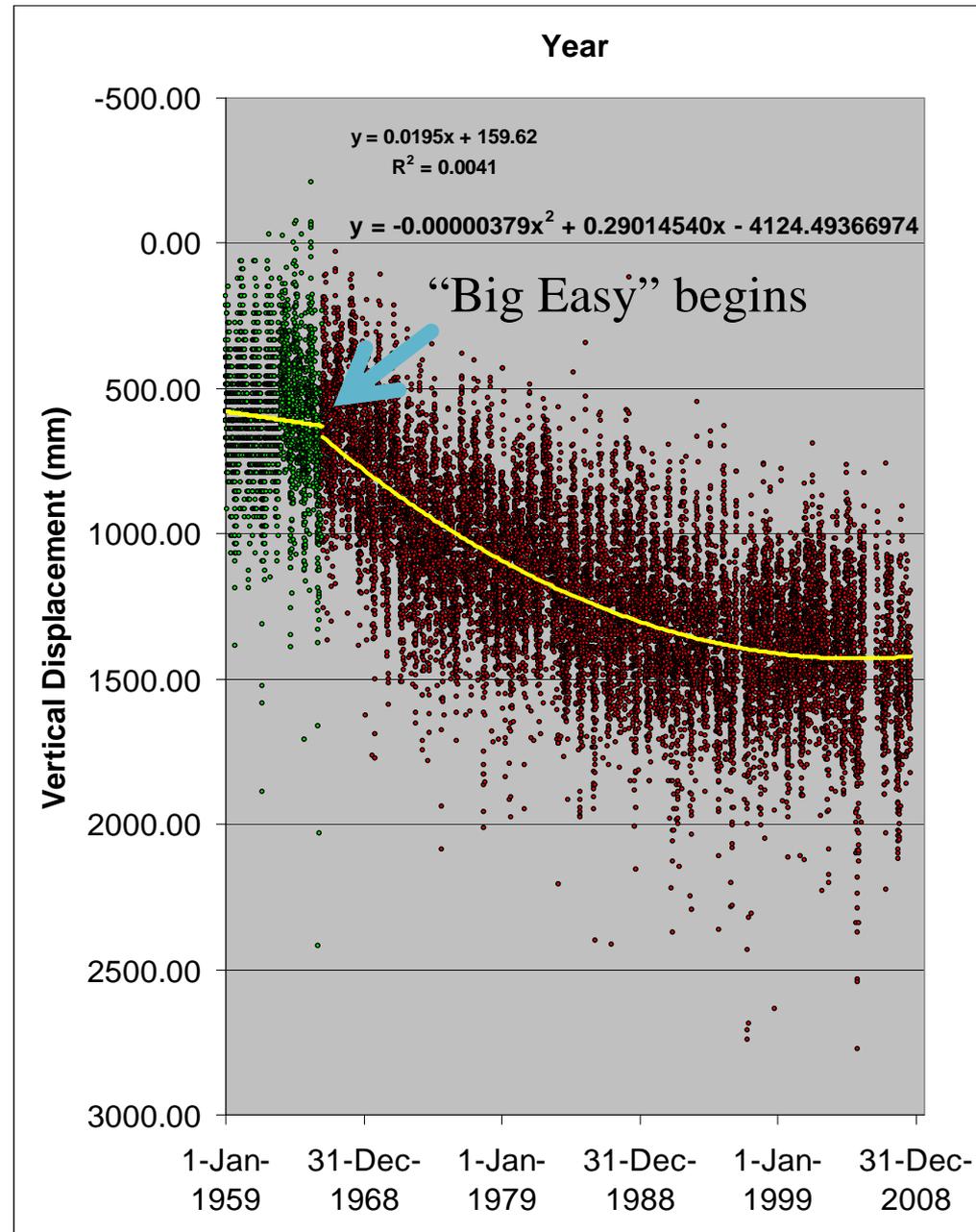
- Natural consolidation and compaction
- Desiccation by urbanization (behind levees)
- Organic soil oxidation
- Oil & gas extraction: variable 0 to -3 mm/yr
- Water pumping: variable up to -65mm/yr

The Water Gauge at Paris Road Bridge

- Corroborates geodetic studies.
- Shows that slow (7mm/yr) subsidence abruptly increased at 1966 to high rates ~40 mm/yr.
- Followed by 30 year of exponential decay.
- You've heard of the "Big One". This was the "Big Easy".

The Paris Road bridge has sunk ~0.7 m (2.7ft) since late 1950s! It is due to deep processes, not compaction, fluid extraction or levee building.

Another reality: the surrounding reclaimed wetlands has subsided several additional feet due to desiccation and oxidation.



Roof radar target ~ 0.5 in/yr

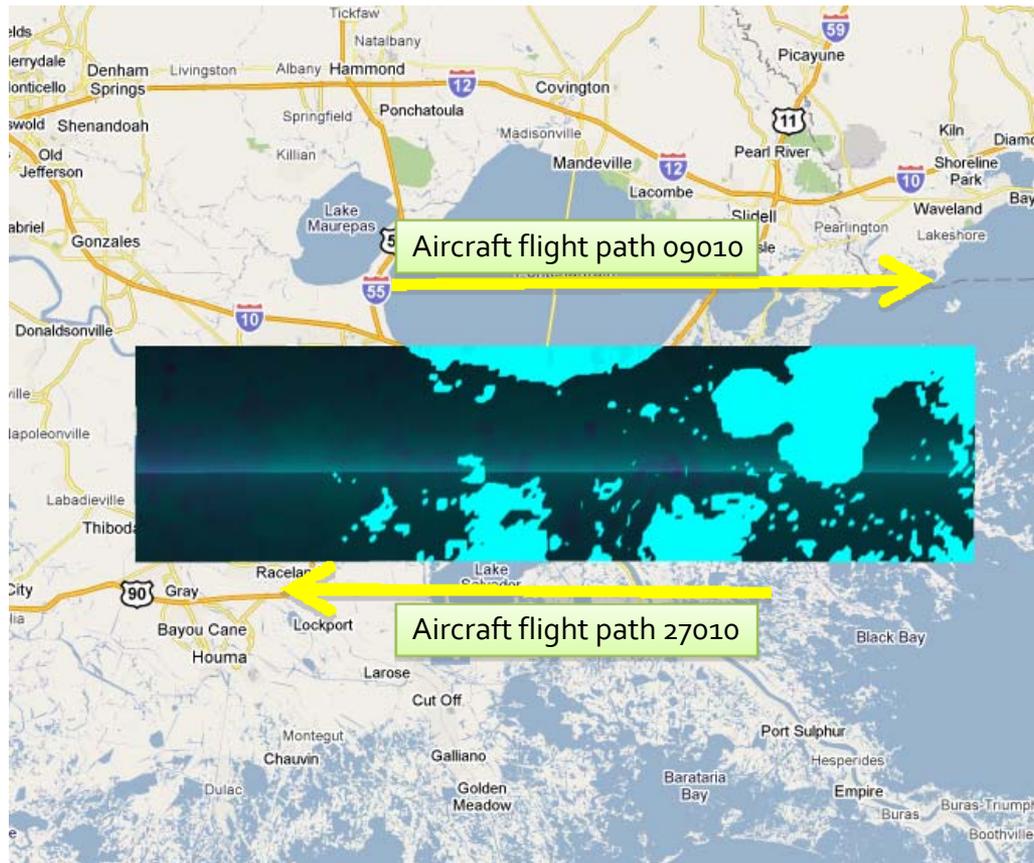


House built on piles (45ft) in 1964.
The driveway, yard, and street have
subsided over 2 ft (0.5 in/yr)



NASA UAVSAR interferograms

June 16 – Sept 3, 2009



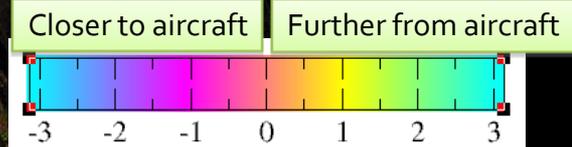
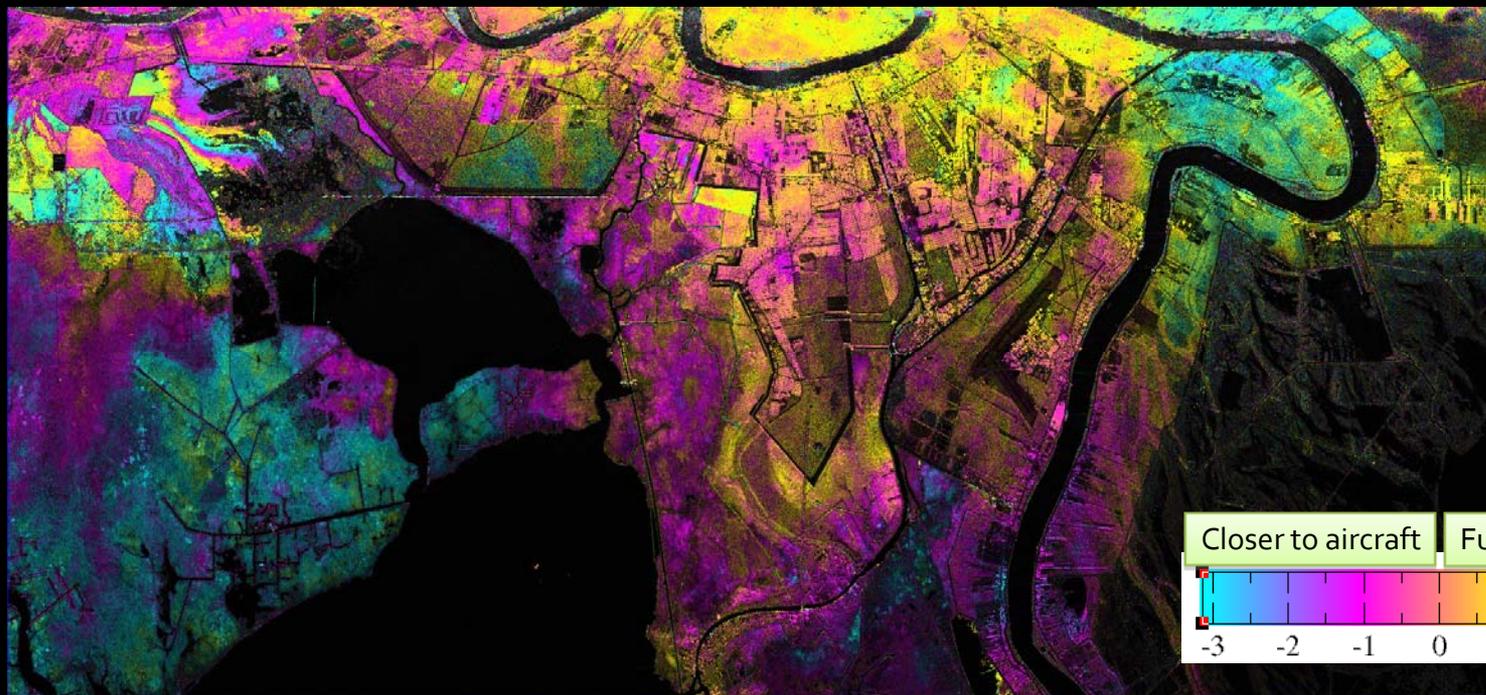
L-Band Radar
23 cm

09010 ↑
27010 ↓
Illumination
direction

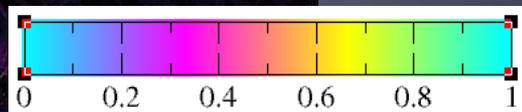
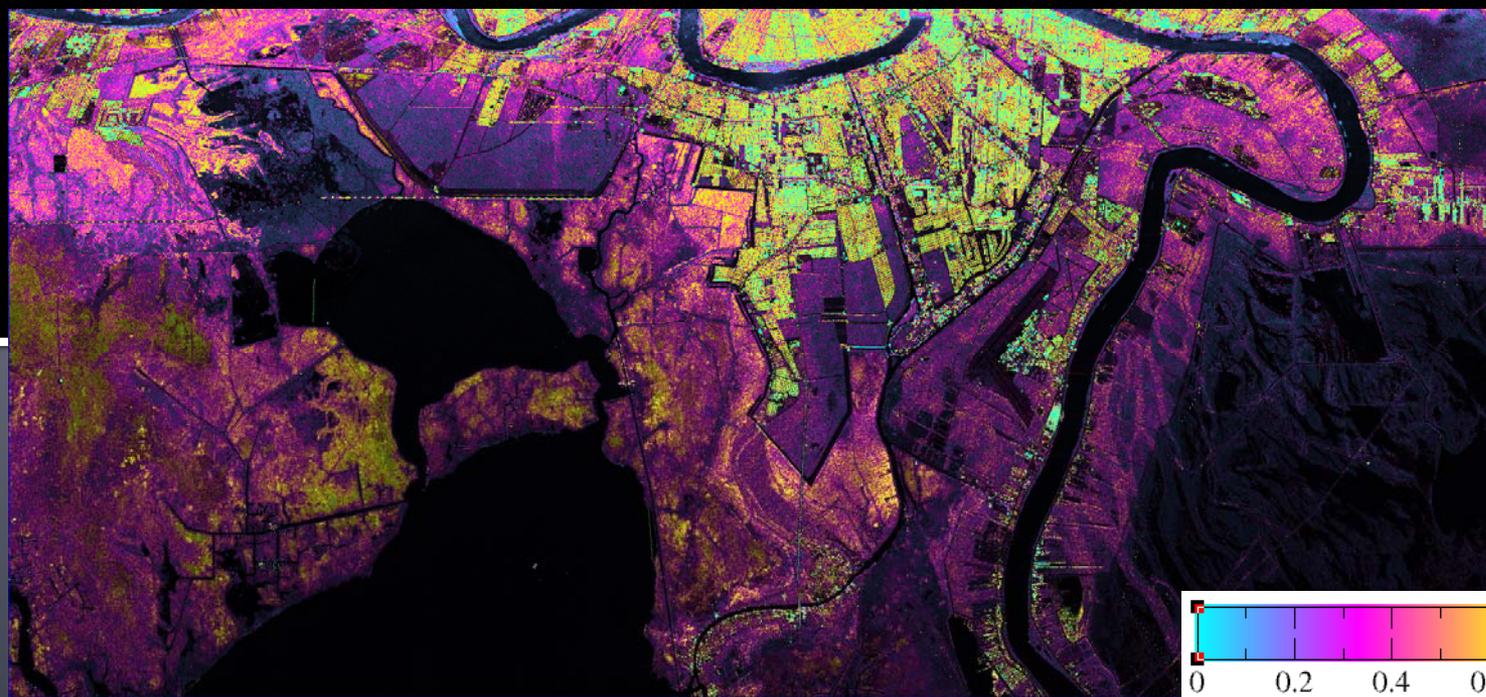
Line of Sight Direction
↓

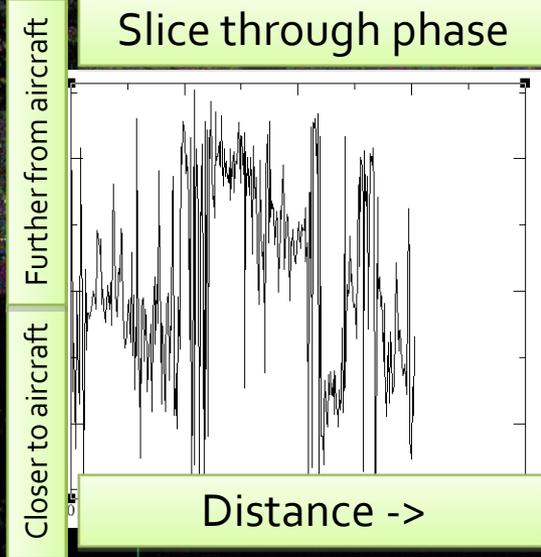
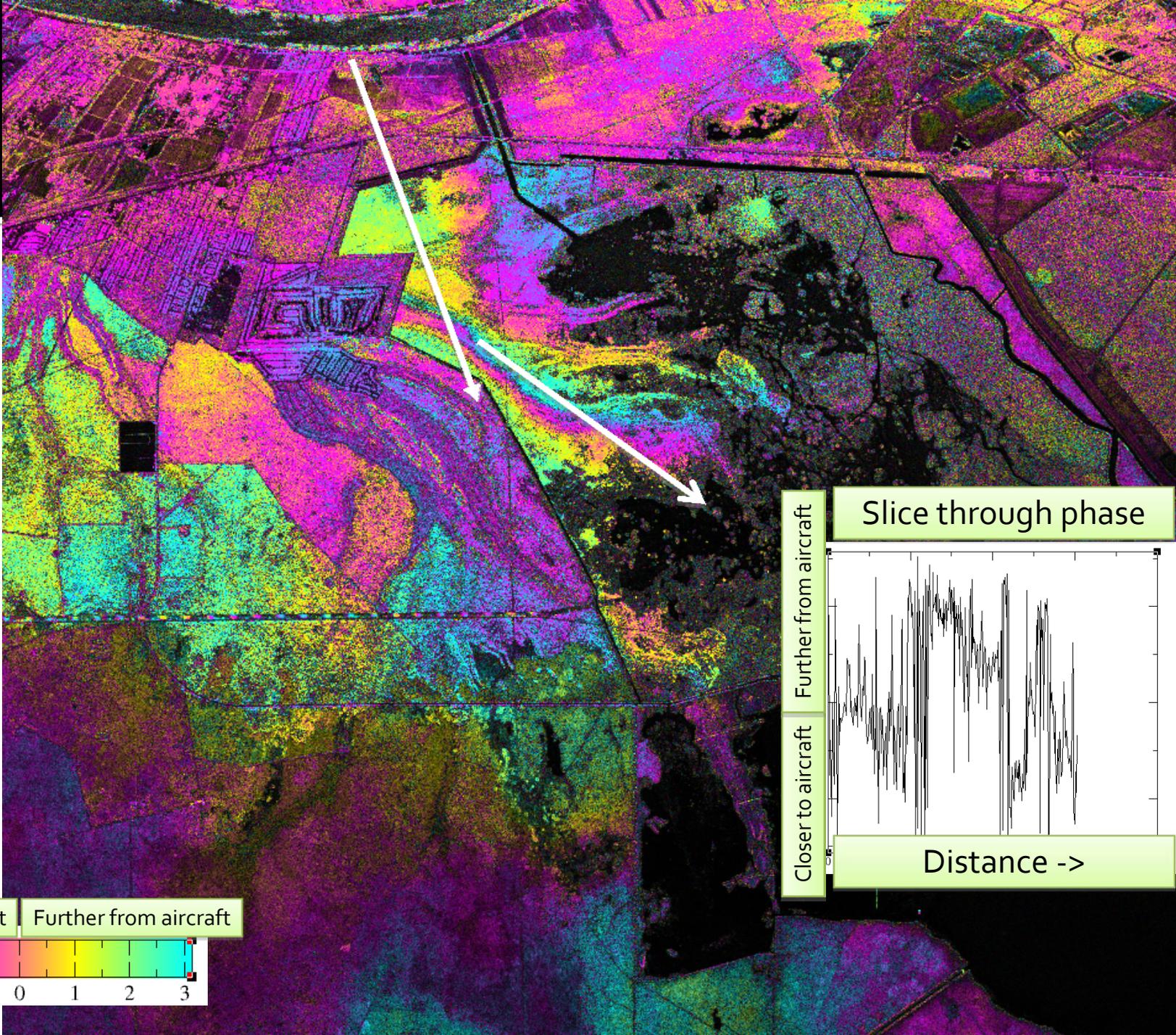
27010

phase

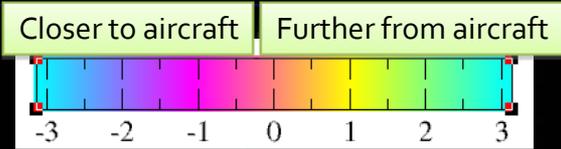


correlation

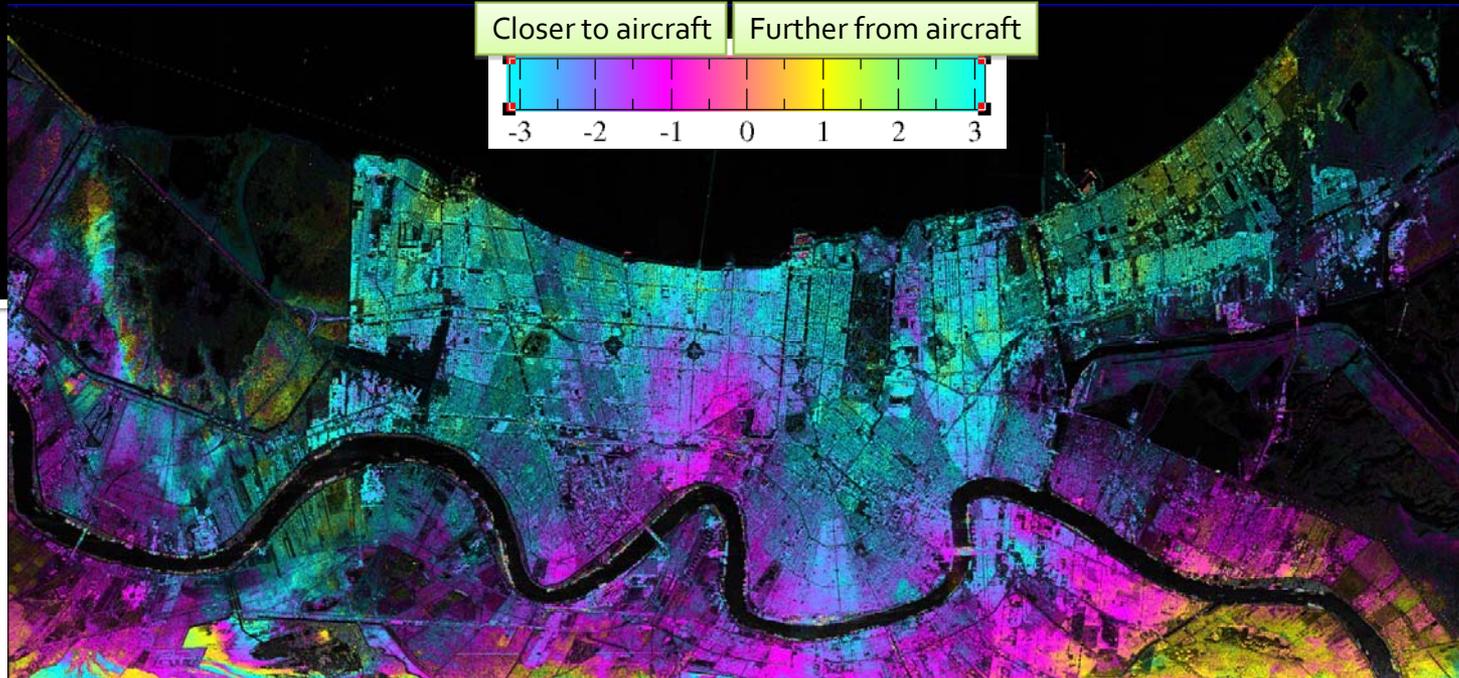




Line of S



phase



correlation

