

Big science challenges related to monitoring and understanding surface and ground water systems

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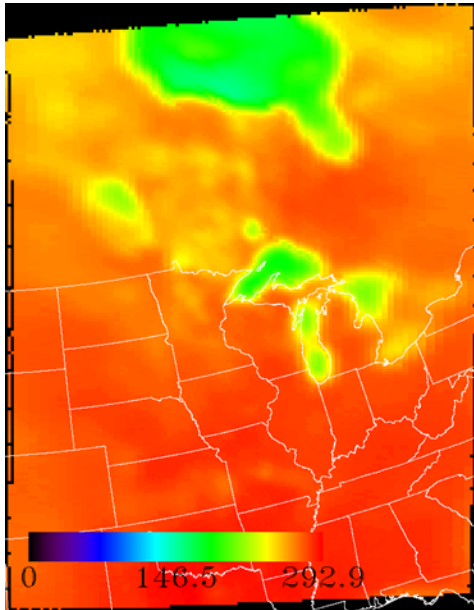
Challenges

- Global surface water grid on weekly increments at 30 meter resolution
- Improved remote sensing capabilities for ground water
- Science specialization



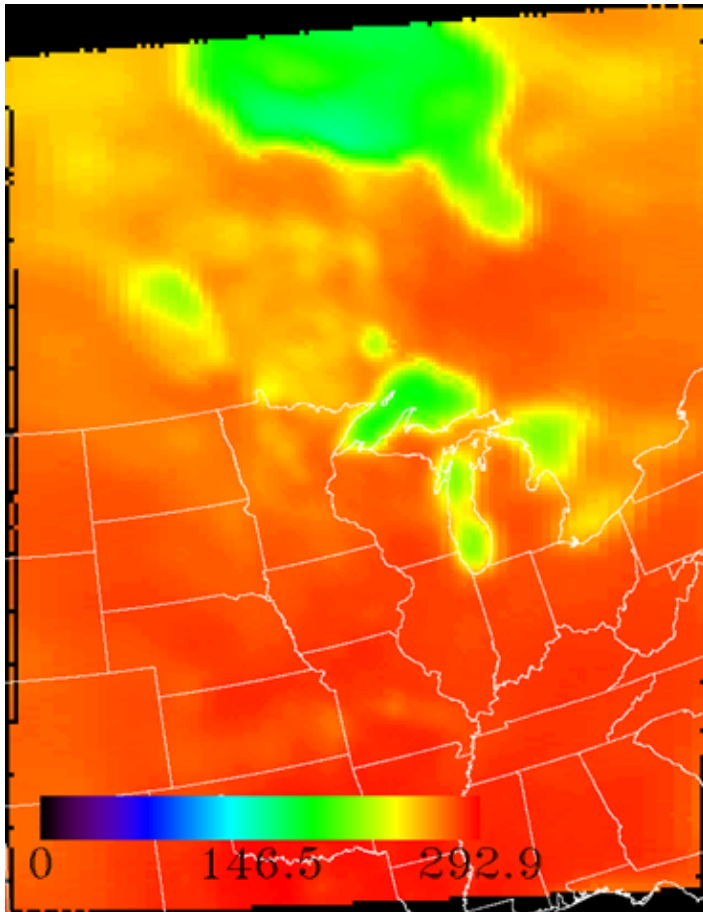
Landsat 8
detection
of
flooding
in the
Lower
Mekong,
August 8,
2014.

Cloud and Night Obscuration on Surface Water Observations

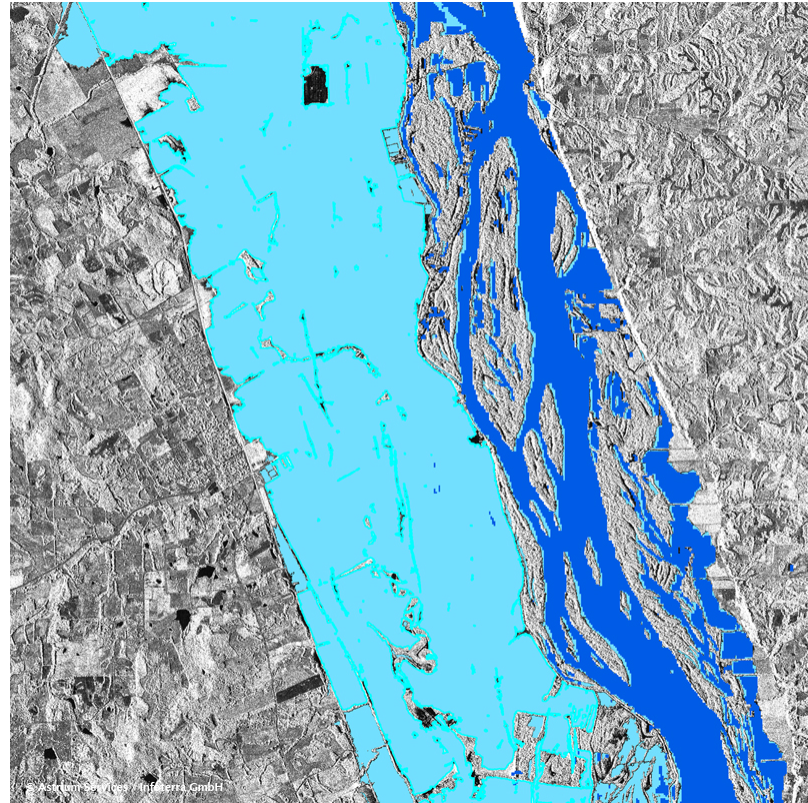


- Traditional satellite data source (e.g. Landsat) capabilities for mapping the spatial extent of surface waters and flooding are limited by night and opaque clouds.
- Long wave infrared works day or night, but detection of surface waters in LWIR is prone to errors and LWIR is still subject to cloud obscuration.
- Active microwave works well, but is not frequently collected and is available as a commercial service. One possible option is the DLR TerraSAR-X with an 11 day repeat cycle at equator?
- Passive microwave has coarse spatial resolution. Is it possible to design sensors with higher spatial resolution capabilities?

Mapping spatial extents of surface water

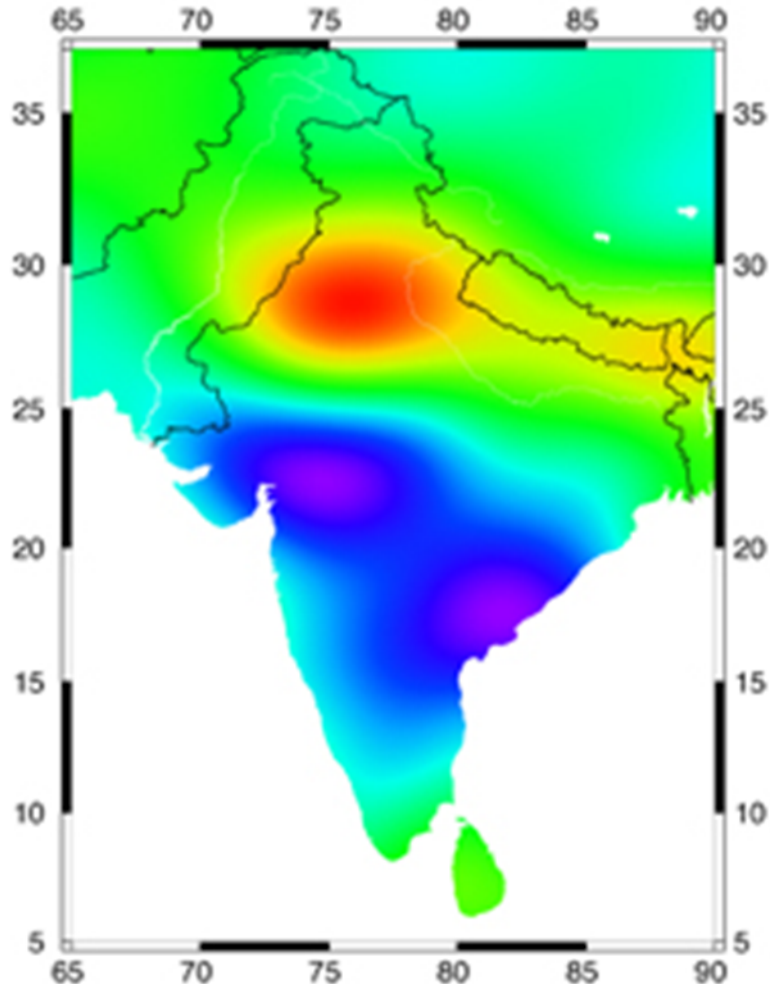


ATMS Image showing detection of lakes. ATMS spatial resolution is too coarse for hydrologic applications.



TerraSAR-X image showing flooding of the Mississippi River.

Limited remote sensing capabilities for ground water detection / monitoring



- Traditional remote sensing sources are unable to detect and monitor ground water
- NASA/DLR Gravity Recovery and Climate Experiment sensor has been able to detect changes in the mass of land surfaces, linked to groundwater changes. However, these product have coarse spatial resolution.
- Can gravity mapping from space be extended to higher spatial resolution?

Science Specialization

The complexities of individual data sources or models tend to absorb individual scientists and science teams. This limits the synergistic combination of data sources and science teaming.