Task 7.4

Climate change

Climate Essential Variables from LOTUS

- To ensure knowledge of the climate and its the Global Climate Observing System (GCOS) program has developed the concept of essential climate variables (ECV)
- There are 50 variables that ensures that the different components of the climate is measured
- In the LOTUS projects the following ECVs has been monitored/derived
  - Sea level
  - Sea state
  - Lake and river levels
  - (River discharge)
  - Soil moisture
- ECV that might be derived from LOTUS products
  - Surface currents
- Hence, the LOTUS products contributes to the general continuous monitoring of the climate
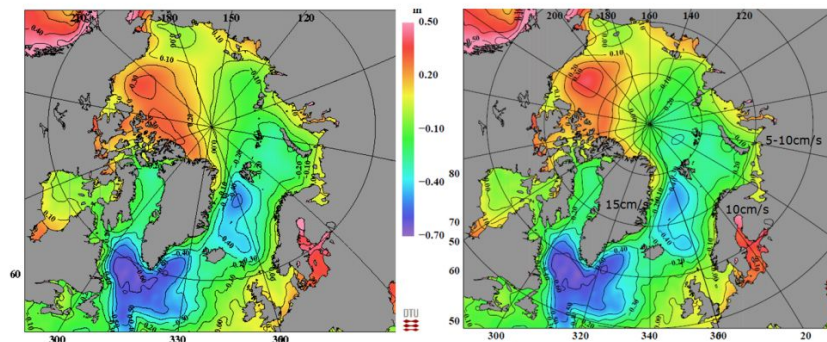
Improvement from SAR

- Open Ocean
  - Generally more accurate sea level estimates
- Coastal Ocean
  - The sea level can be estimated closer the coast
- Polar Ocean
  - Sea level can be estimated from leads in the sea ice, which implies a significantly larger amount of data.
  - Improvements in follow on products, such as the mean dynamic topography (MDT)
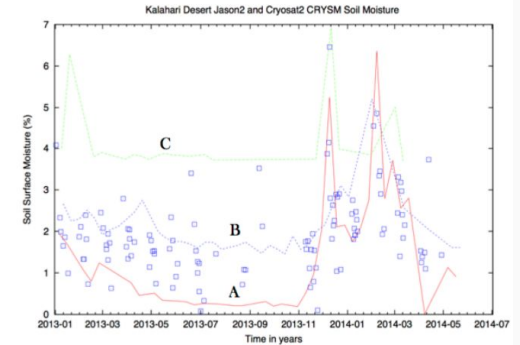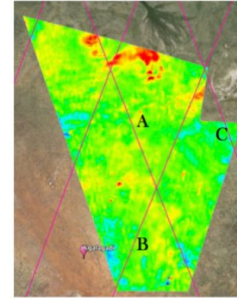
Arctic sea level
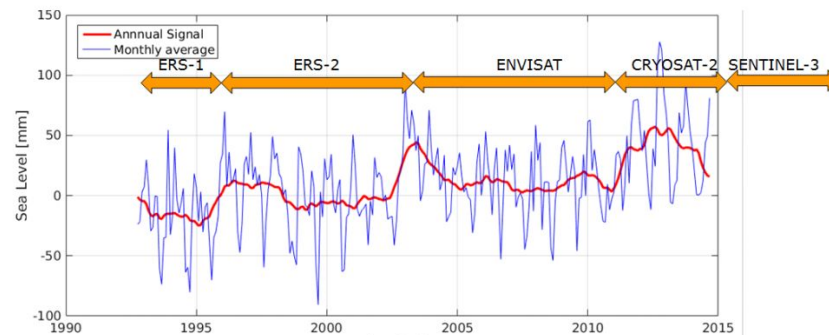
Improving the MDT

Before CS2   After CS2

Soil moisture

Soil moisture, improvement from altimetry (CryoSat-2)

- Finer sampling along-track compared to existing soil moisture products.
- More precise measurements in arid and semi-arid terrain.
- CryoSat-2 data has greatly improved existing DREAMs

Validations of enhanced DREAM for Kalahari desert, with Jason-2 data

River and Lake levels

Lake and river levels, improvements from SAR

- Higher resolution
  - More valuable observations
- Better precision
  - We can detect smaller water level variations
- More accurate water levels for smaller water bodies
- Continuation of the water level measurement on a global scale

DTU Space
National Space Institute

Services that might benefit from the LOTUS results

Ocean
- ESA Climate change Initiative (CCI) (http://www.esa-sealevel-cci.org/)
- MyOcean Sea Level TAC
- Copernicus Marine Environment Monitoring Service (CMEMS) (http://marine.copernicus.eu/)

Land
- The Global Terrestrial Network – Hydrology
- Hydrolare (http://hydrolare.net/)
- The International Soil Moisture Network https://ismn.geo.tuwien.ac.at/
- PISTACH project
- Services that provide water level time series
  - The River & Lake project (No longer updated) (http://tethys.eaprs.cse.dmu.ac.uk/RiverLake/shared/main)
  - DAHITI (http://dahiti.dgfi.tum.de/en/)
  - Hydroweb (http://ctoh.legos.obs-mip.fr/products/hydroweb)
- The Global Land component of the COPERNICUS Land Service (http://land.copernicus.eu/global/)