

## Overview of 18 October, 2016 by Sea level variation group

- The day started with the student group work where the following questions, about the first day lectures were formulated:
  1. What are the impacts of El Nino on sea level over the Pacific Ocean?
  2. What is the difference between the absolute dynamic topography and the mean sea level anomaly? Which one can be correlated with tide gauge records?
  3. Explain Kalman filter and extended Kalman filter
  4. Which is the best tide gauge sensor?
  5. Explain the viscoelasticity.
- Then in the plenum the questions from the different students groups were answered /discussed.
- Lecture on Data Assimilation in Geoscience: Atmosphere and Ocean by Dr. Albert Carrasi. Learnt about the basic idea of data assimilation and different techniques such as the kalman filter, extended kalman filter and ensemble kalman filter. Different methods of assimilation were discussed including issues such as multiple minima, non gaussianity and non-linearity, and the benefit of increasing corrections in the direction of maximum error propagation.
- Lecture on Indian Ocean Sea Level Variation and Potential Impact from the Greenland Ice Sheet by Prof. O. M. Johannessen.

Warming of the ocean and the melting of glaciers and ice sheets is, currently causing around 3 mm per year. Different contributions to sea level rise were discussed including phenomena such as the melting of the ice in crevasses in the Greenland ice sheet leading to lubrication and accelerated movement of the ice sheet. The sea level along all Indian Ocean has increased since 1960 up to around 2 mm per year. In future the Sea Level Rise will be more influenced by the projected melting of the Greenland Ice Sheet and glaciers.
- Students' presentation and poster presentation.

All the participants presented their scientific works. It was a very interactive session where we got to know about the work of others. The presentations were very informative covering various oceanographic domains such as data assimilation, ocean modelling, field measurement and observational studies focused basically on physical and dynamical ocean processes.
- Lecture on The Nansen Cloud Satellite Data and Analysis System by Dr. Anton Kosov:

This is a user friendly interface that has various functions such as easy access to in-situ and satellite data, ease of software access for analysis including online visualisation and analysis and access to code development via github. It has facilities for automated data

processing, incorporation of scientific data and metadata and compatibility with different geophysical data formats such as netcdf and geotiff including the reading and writing of files. Python forms an important component of the system because it is an open source and facilitates code development.

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