

Analysis of waveforms in the satellite altimetry by using neural networks

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Motivation









The study area





The study area – used data





Jason 2 satellite:

- Ocean Surface Topography Mission (OSTM)
- Launched June 20, 2008
- Time series between 2012 2016



https://directory.eoportal.org/web/eoportal/s atellite-missions/j/jason-2

Processing the data





- Normalize the data
- Label the data to peak and noise
- → Problem: To find a peak, we need more informations than only the label!

Bins





The output of the neural network gives us the **probability** for each **label**



- 1. Create a window with the size of 30 bins which defines the input for the network
- 2. Save the label and probability from the output
- 3. Move the window 2 bins and repeat it





The neural network – Methodology 2





Analysing the study area

Data processing

Neural network: tracking

the peak in the water waveform

Calculate the water height



Comparison of the calculated water level with the water level, measured by in situ stations

$$h_i = h_{sat} - (R + \Delta R) + corr$$

 h_i = Altitude of the satellite above the reference ellipsoid R= measured range ΔR = Retracked range corr= Applied corrections







Calculation of the water heights - statistics







Calculation of the water heights - a closer look 2





Because 1 bin \triangleq 0.4684 m even small variations create big errors

Calculation of the water heights - a closer look 2



Future work



Until now, it is not possible to handle noisy datasets, where we have multipeaks close to each other:





Thank you very much for your attention!