

MULTI-PLATFORM NESZ ESTIMATION OVER LAND



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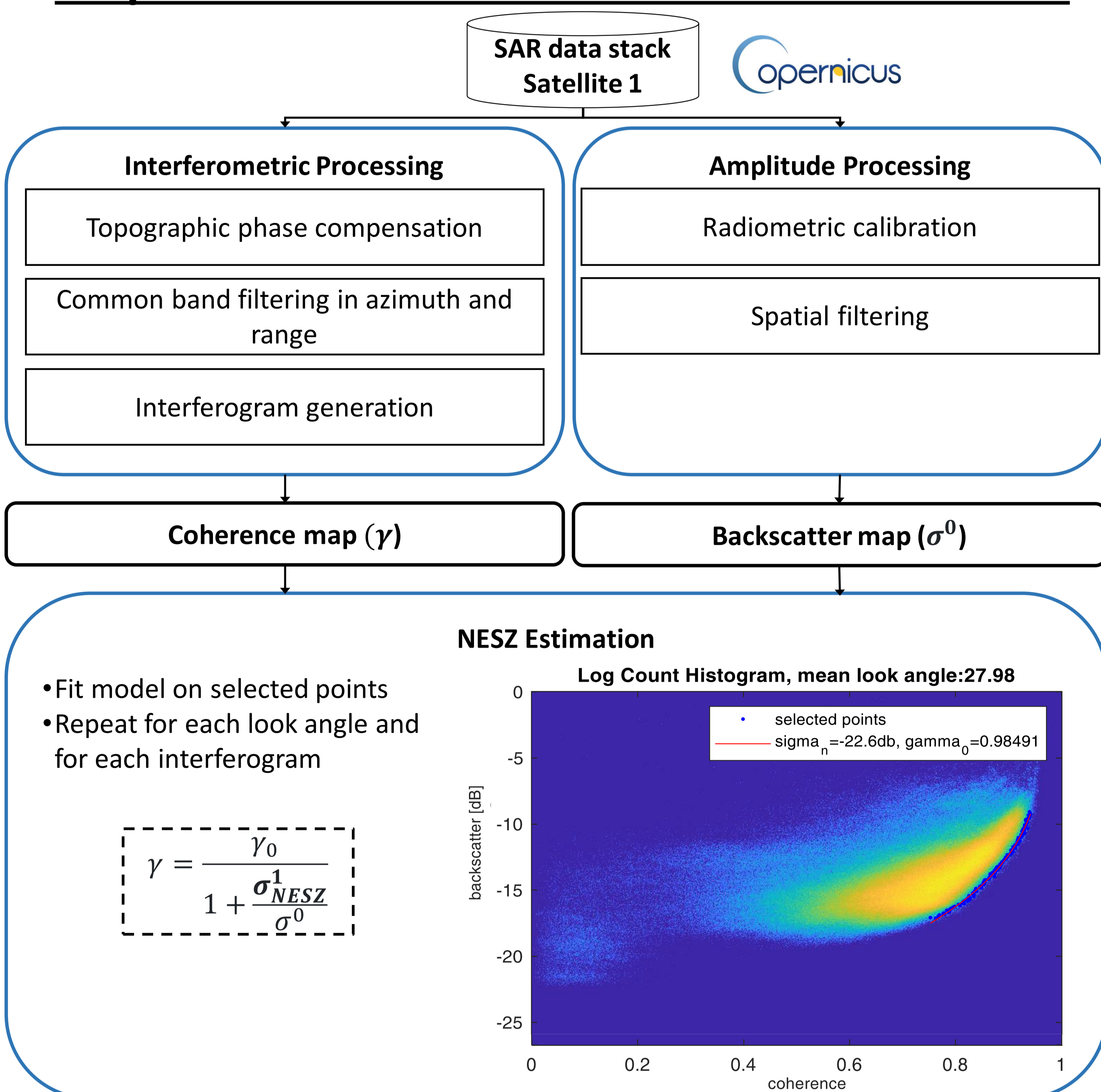
Project title: Geophysical and Atmospheric Retrieval from SAR Data Stacks Over Natural Scenarios

1. Introduction

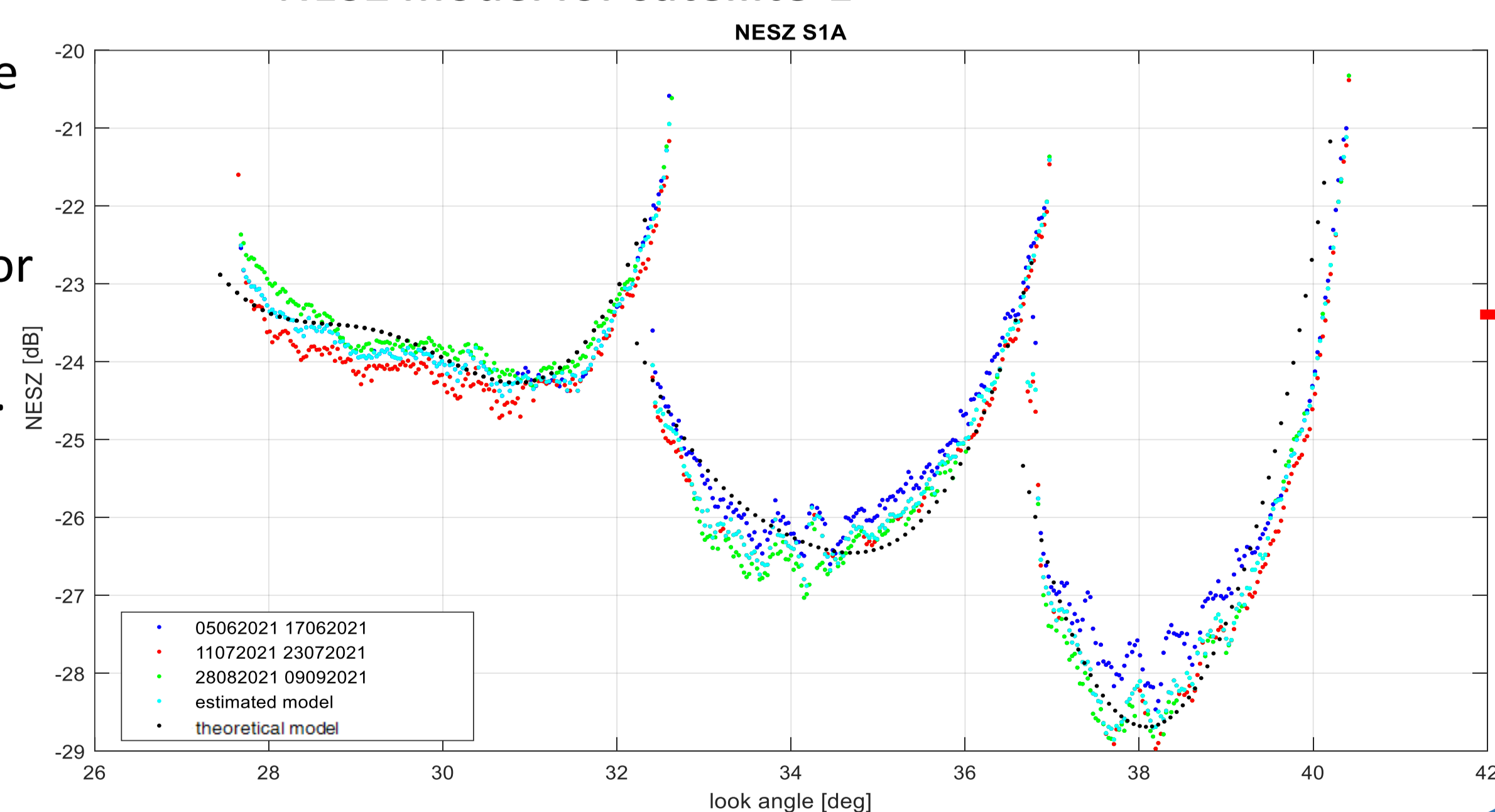
- Noise Equivalent Sigma Zero (NESZ) calibration is critical for the validation of new satellites and the precise monitoring of atmosphere, deformation, etc.
- Standard techniques exploit the smoothness of water bodies, which deflect all the energy from the radar, allowing to measure noise levels directly. However, they consider a different scenario w.r.t land and require processing additional data.
- The proposed approach for NESZ estimation exploits an interferometric stack of images over land, and the theoretical relation between coherence and noise.
- The method allows to measure the NESZ of a single epoch, given that a reference stack is available.

2. Method overview

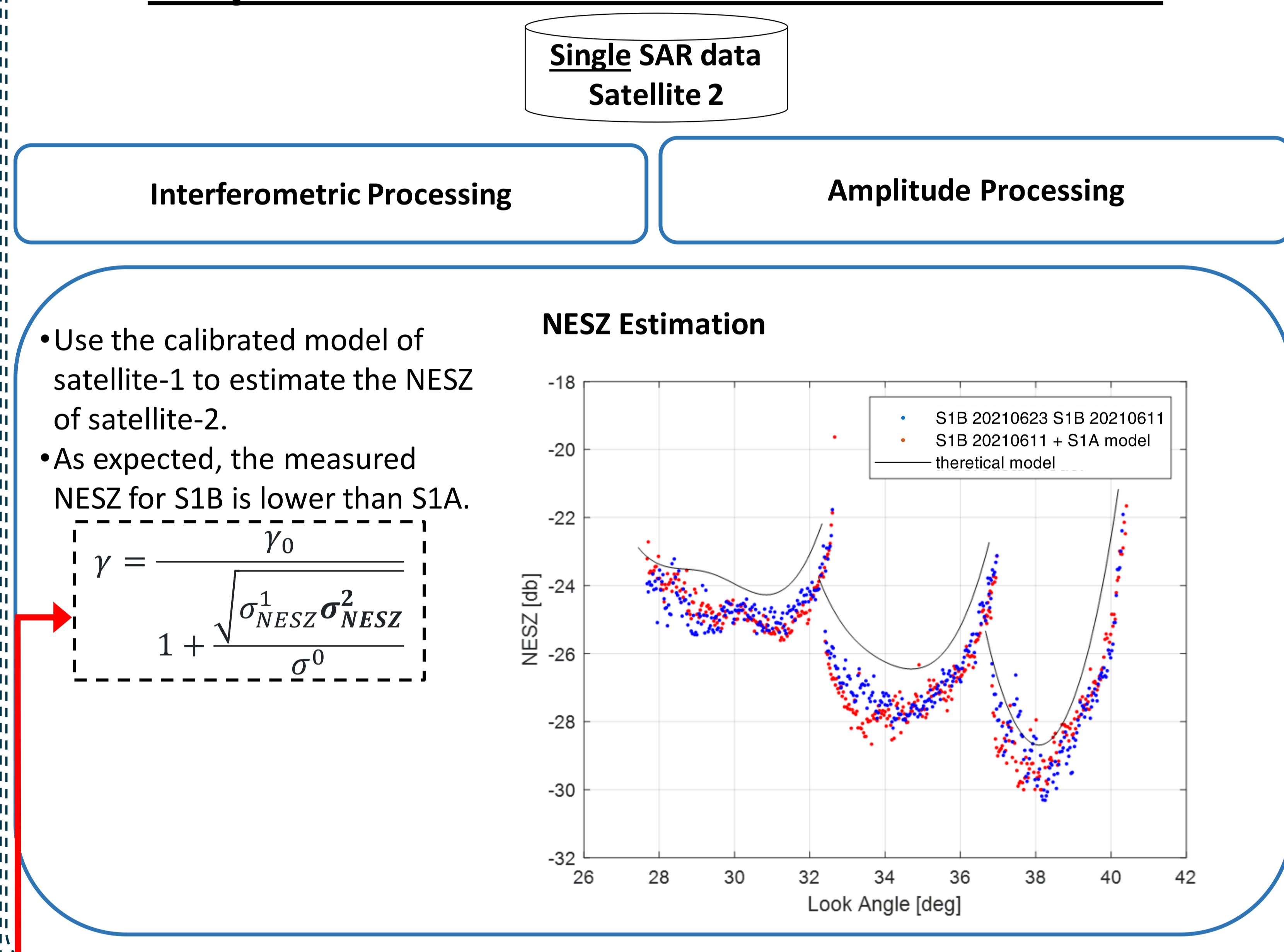
Step 1: NESZ calibration of reference satellite



NESZ model for satellite-1

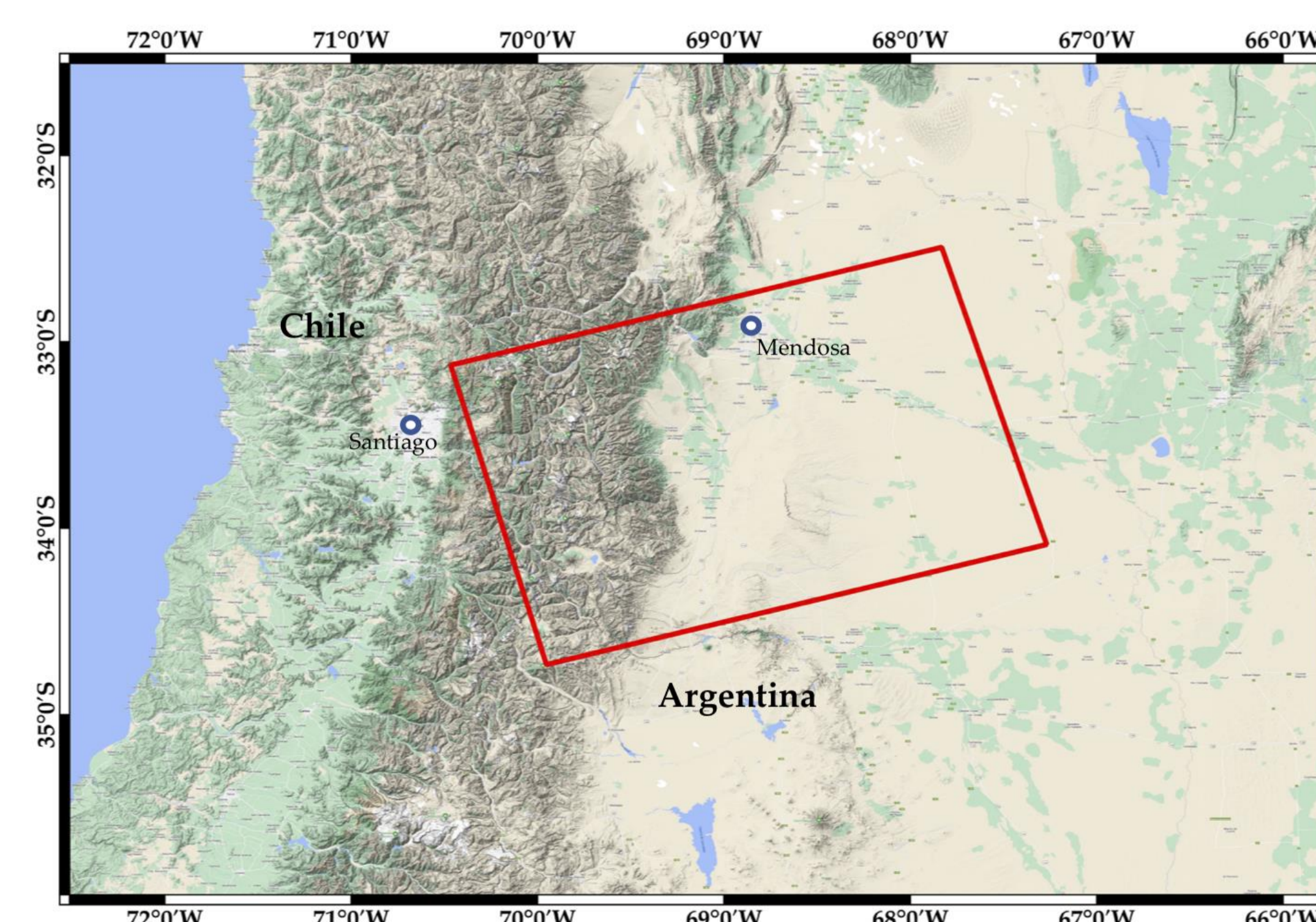


Step 2: NESZ calibration of new satellite



3. Materials

- A stack of 14 Sentinel-1A image was used to compute the reference NESZ model (σ_{NESZ}^1).
- One additional Sentinel-1B image was used to compute σ_{NESZ}^2 .



4. Conclusions

- In this work we exploited a stack of Sentinel-1A data to estimate the NESZ of a single Sentinel-1B product over land.
- Standard interferometric data is used, no need to obtain images over water.
- The method allows to separate the contributions of the master and slave noise levels, by constructing a robust model for the master's NESZ.
- The approach can be applied to:
 - ✓ standard processing for noise modeling
 - ✓ immediate validation of new missions, just one image is needed.