WP2700 – Coastal areas

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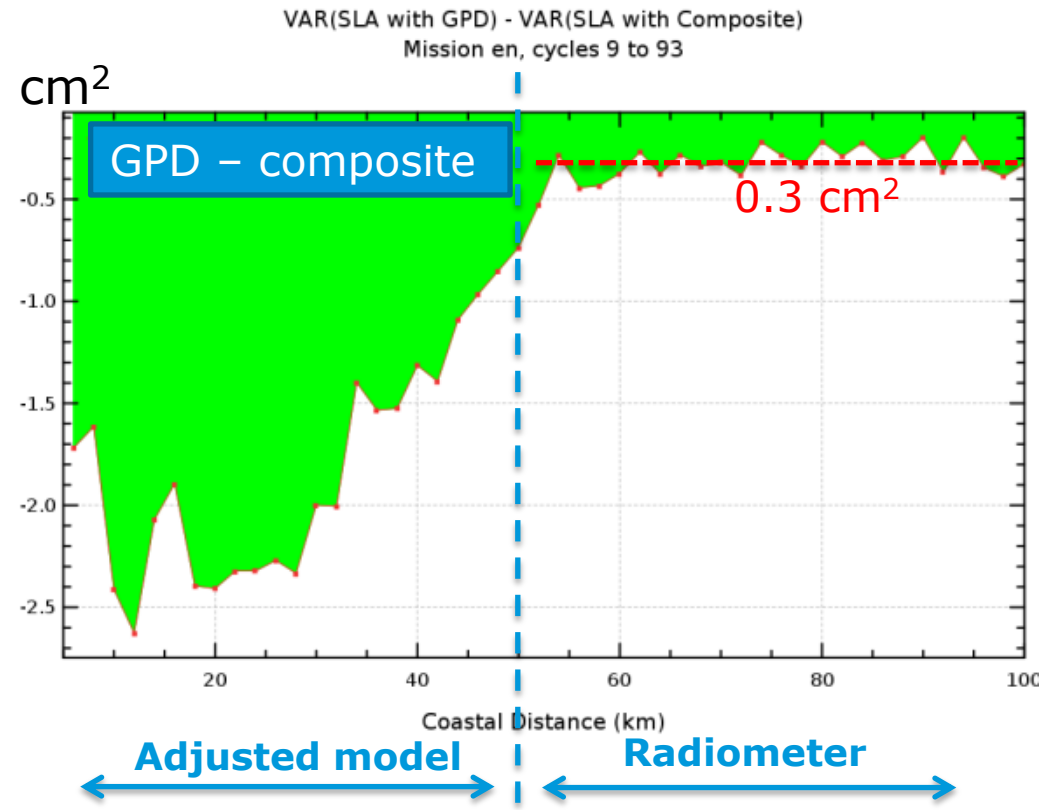
Outline

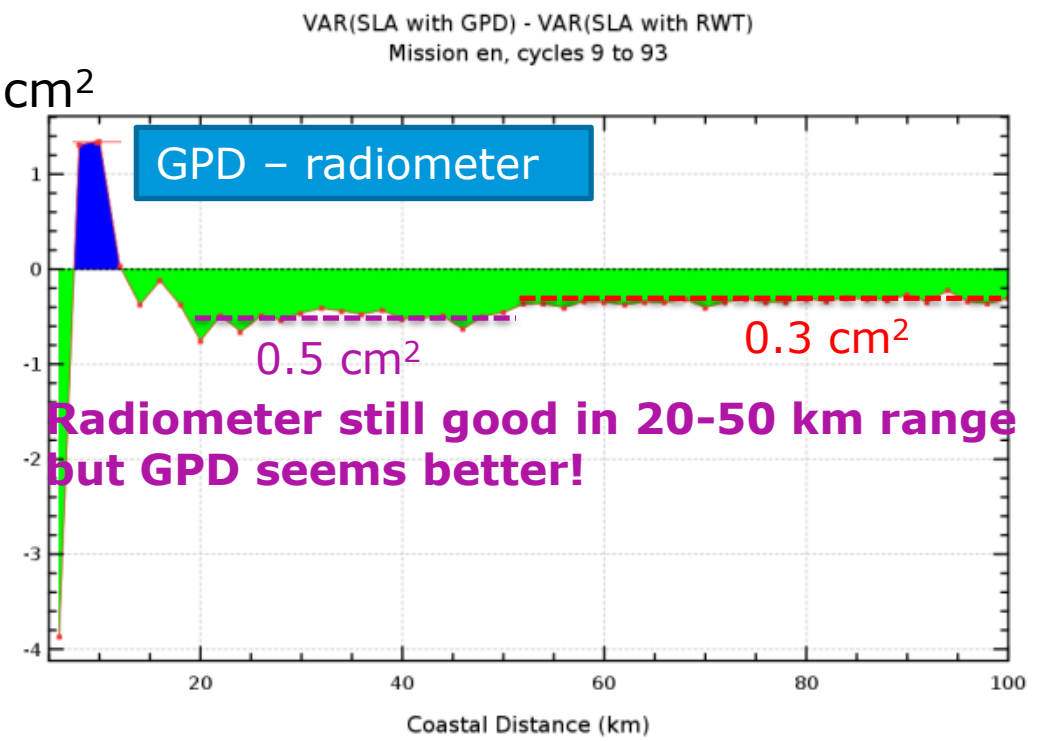
- **GPD correction in coastal areas**
- **Coastal Proximity parameter: rationale and use**
- **Relevant Recommendations**
- **Open issues**

GPD Wet Tropospheric Correction

- **GPD (GNSS-derived path delay) by Univ. Porto, already presented in WP2300**
- **BUT of special interest in coastal zone, so we will discuss it again here**
- **Next slide, comparison of GPD with:**
  - **composite correction**: radiometer offshore 50km, model adjusted to radiometer (“Dynamically Linked Model”) inshore of 50km
  - **radiometer correction** up to coastline

SLA variance difference





Notice that the statistics for coastal distance lower than 15 km are not significant due to the low altimetry number measurements.

Recommendation 1: GPD

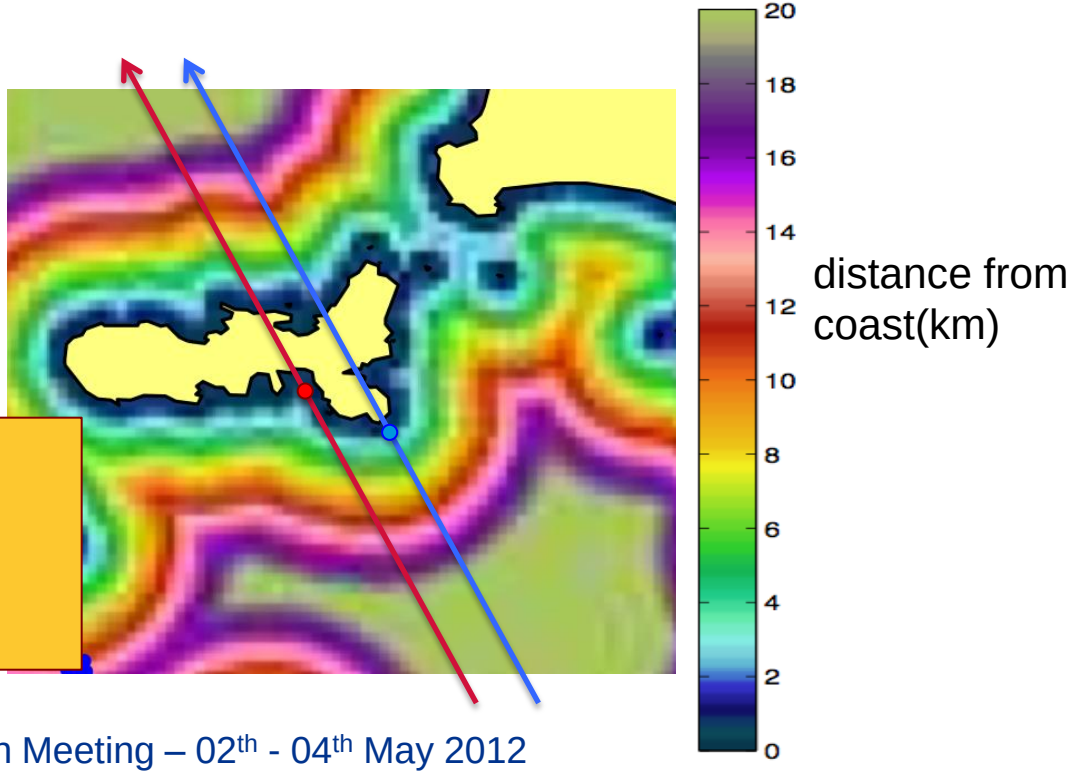
- **Given that….**
  - The MSL trend estimation is significantly modified in coastal areas with the GPD correction
  - GPD reduces SLA variance also in coastal areas and is always available (no gaps)
  - the GPD was also found to improve the estimation of the sea level for mesoscale applications compared with the reference.

Recommendation:

We recommend to use the GPD algorithm for the estimation of the wet tropospheric correction for climate applications.

Coastal Proximity Parameter $\mathcal{P}$

- **In order to determine how 'close to the coast' we can reach with climate-quality data, we need to screen data and corrections versus some independent variable**
  - 'Distance from coast' is crude because it does not capture the enormous variability in 1) morphology and 2) coastal conditions

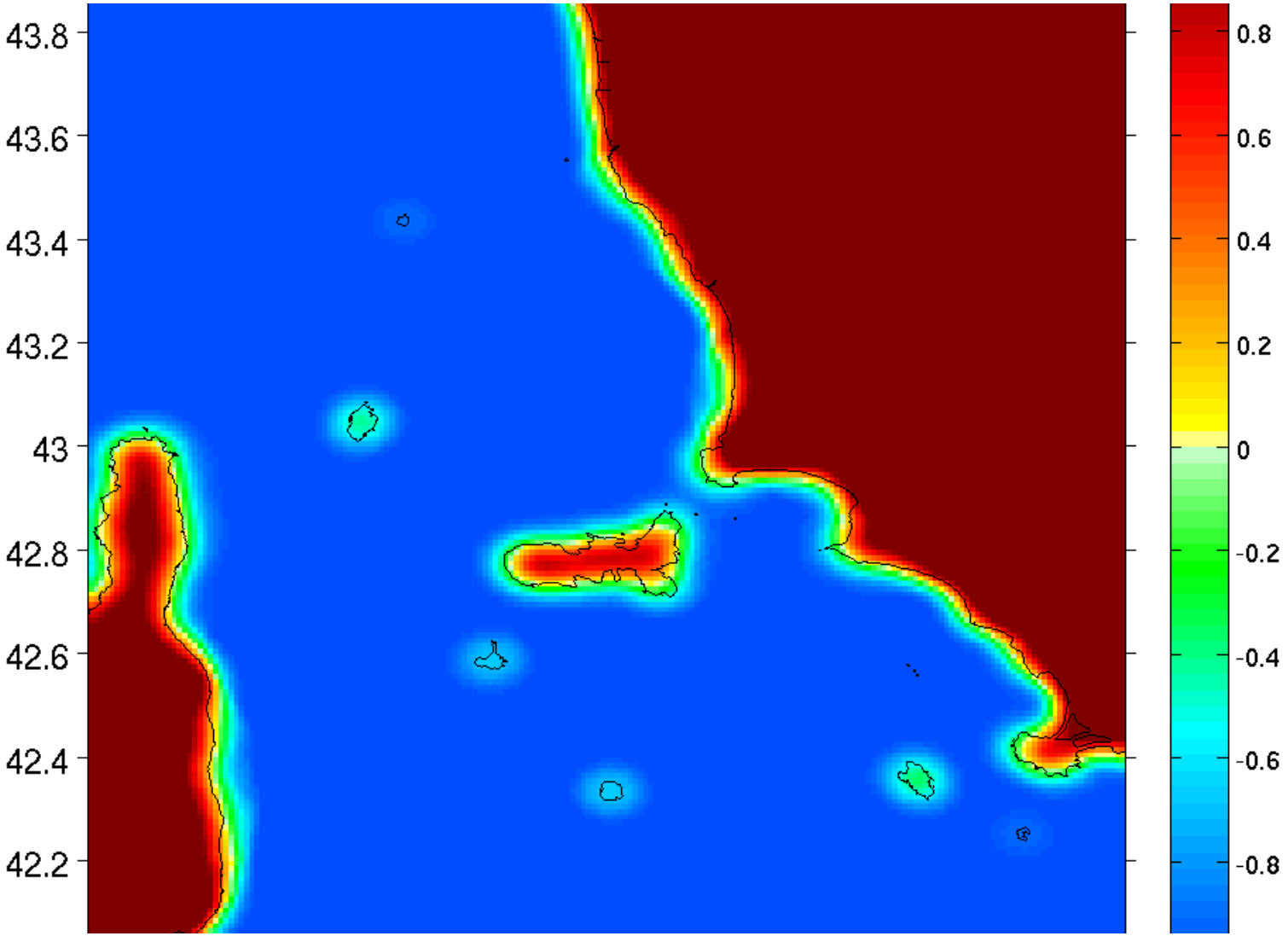


Example: Elba Island, Tuscan Archipelago

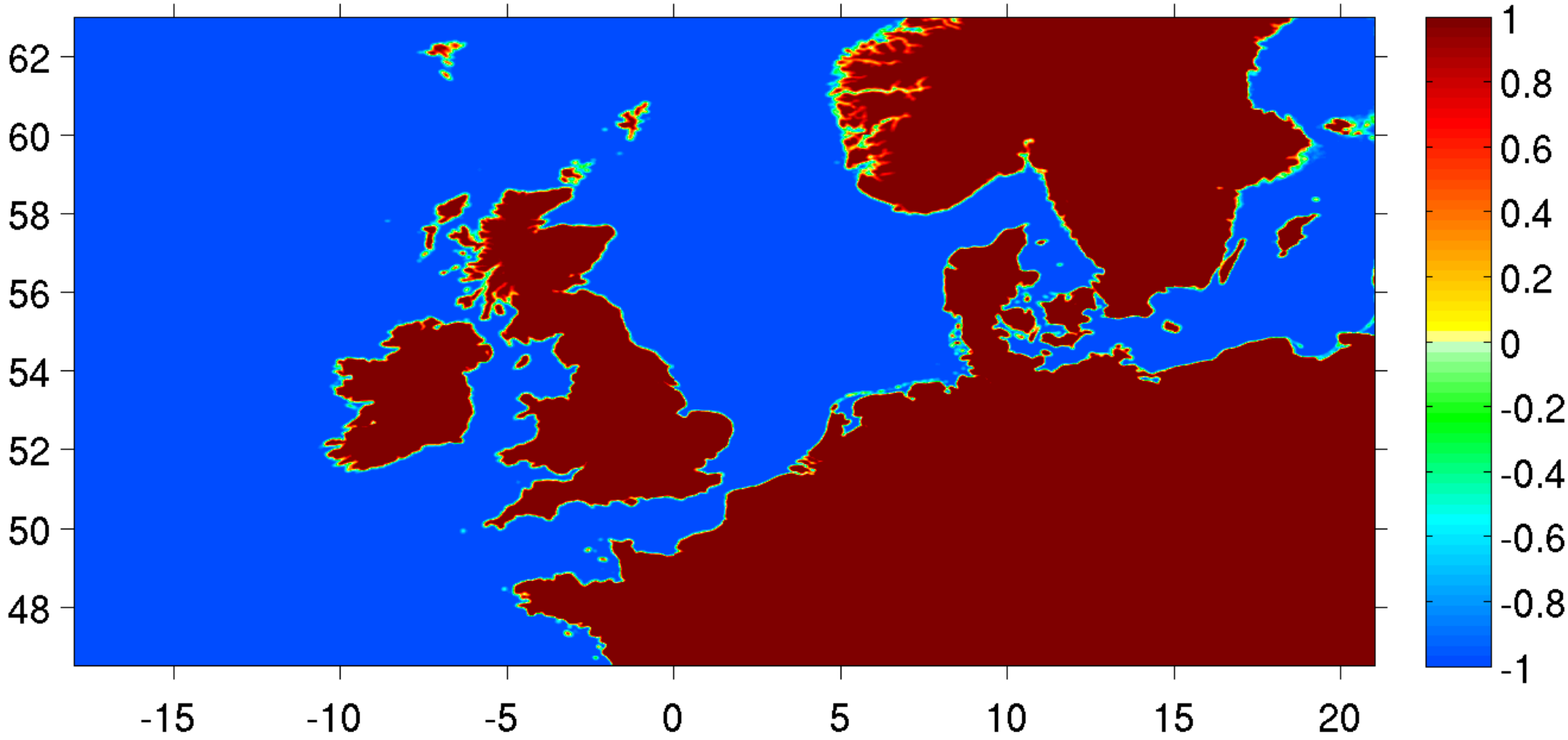
Coastal Proximity: computation

- **This new parameter has been explicitly designed to account for effects of land morphology on retracking, so should be used to assess how 'retrackable' waveforms are in a given location**
- **Two effects accounted for:**
  - power deficit due to "missing ocean"
  - land returns in various gates depending on land elevation
- **Computed using ACE2 hi-resolution (3 arcsec, i.e. ~90m) global DEM**
  - original version (v.1) of P presented at CAW-5 in October 2012 and received constructive feedback → some improvements
- **Latest version of $\mathcal{P}$ global map (v.2) computed on 0.01° resolution and available of SL CCI FTP server since January**
- **Goes from -1 (open ocean, no land effect) to +1 (full inland, no ocean effect).**
  - Zero crossing defines a sort of 'virtual coastline'

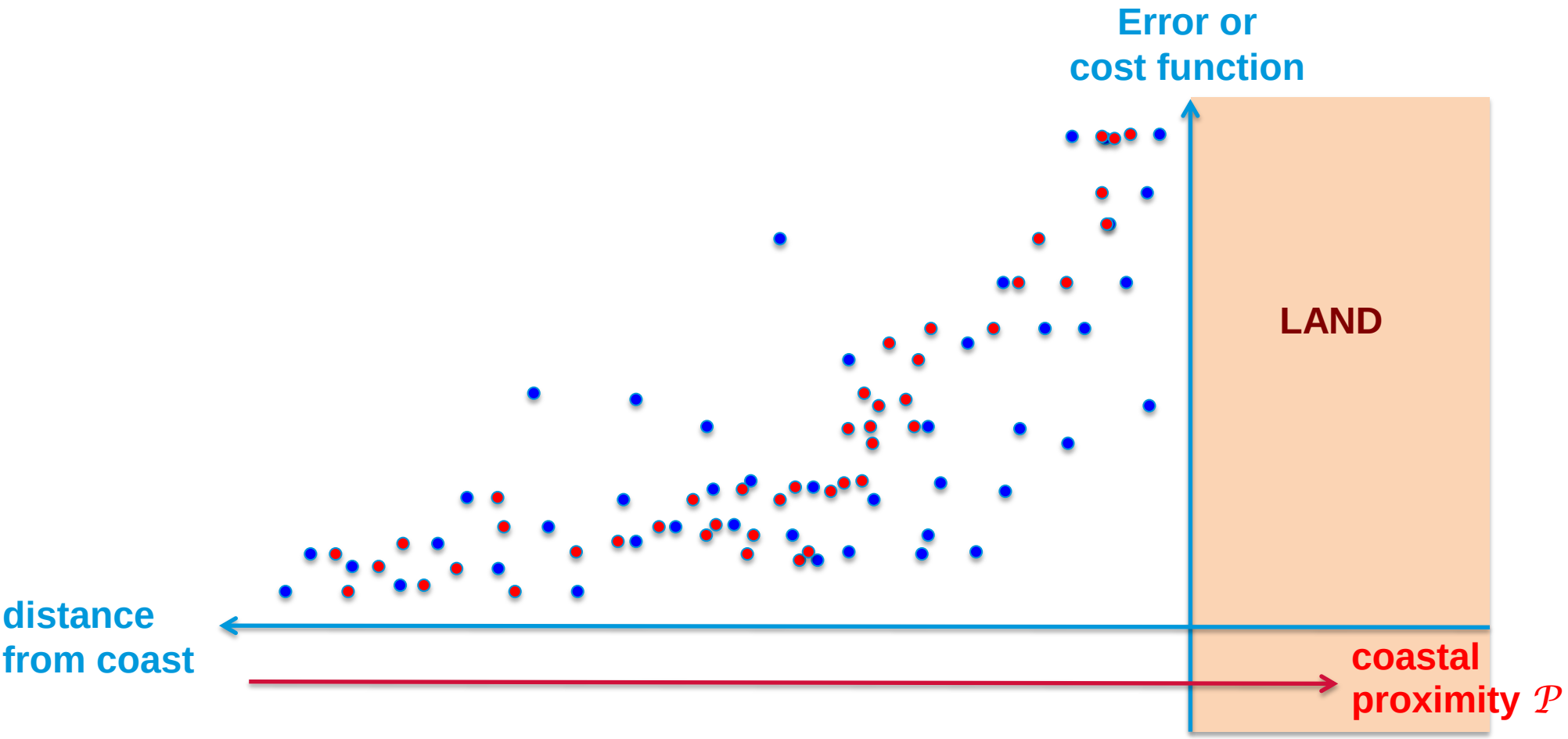
Coastal Proximity: examples



Coastal Proximity: examples



Using $\mathcal{P}$



Recommendation 2: Coastal Proximity

- Coastal Proximity is an auxiliary data to improve some algorithms as for instance the editing procedure to remove spurious measurements in coastal areas.
- Therefore, the diagnoses of validation defined in the PVP document are not applicable for this algorithm and the coastal proximity parameter has not been evaluated.
- Nevertheless, the important thing is that it is tested and used for the screening..

Recommendation [draft, to be approved]:

The Coastal Proximity parameter should be included in the products

Coastal Ocean: open issues

- **The crucial question…**

How close to the coast can we still recover data of sufficient quality for climate applications?

…still remains open. It can be answered both in terms of distance from the coast or (perhaps better) in terms of coastal proximity $\mathcal{P}$

Open issue

Quantification of the improvements expected (and coming) with delay-Doppler Altimeters

links to Cryosat+ project