ENVISAT RA-2 SEA LEVEL DATA VALIDATION USING DAILY MEAN SEA LEVEL DATA FROM A TIDE GAUGE, IN THE GULF OF CADIZ (SPAIN).

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COASTAL ALTIMETRY

More than fifteen years of altimetry data over the coastal ocean remains unexploited, mainly because of the uncertainties in the corrections (especially the wet tropospheric component, the high-frequency atmospheric signal and the tides) and issues of land contamination in the altimeter footprint. Some initiatives have dealt with this problem quite recently, basically by developing an extensive reprocessing of the coastal altimetric records. The first attempt was developed in [8] that recomputed the wet tropospheric correction for ERS-1 altimeter data over the Corsica Channel by recalibrating the model correction with the closest available radiometric estimate. Reference [3] reviewed the potential of Topex/Poseidon over the coastal ocean, using both 1 Hz and 10 Hz data but with no improvements in the corrections, and noticed that over flat coastal topography the useful signal is retrievable closer to shore than in the case of rough terrain. An extensive study of coastal altimetry, taking into account all the issues in the reprocessing, was carried out by reference [1]. They describe the generation of coastal altimeter data and are the first to analyze in detail various retracking algorithms and their implementation. They presented some examples based on the intermediate ERS waveform data, and concluded with some recommendations on better (local) tidal modelling, careful screening of the data, improvement of the wet tropospheric correction and retracking. Several other studies have dealt with the limitations of, and possible improvements to, coastal altimetry in recent years, including references [2], [4], [5], [6] and [7].

PRELIMINARY RESULTS

We present a case-study of validation in the Gulf of Cadiz (SW Iberian Peninsula), using ENVISAT RA-2 data and in-situ measurements from a tide gauge in Bonanza (36º 48’ 14” N and 6º 20’ 10” W) during 2004-2007. We use two segments of two altimeter passes

(ascending pass no. 373 and descending pass no. 446) located in the vicinity of the tide gauge. The two datasets are processed in order to compare the daily mean sea level obtained from the instantaneous data that have been measured by the tide gauge and the mean sea level obtained from the instantaneous data that have been measured by the radar altimeter. The contributions of the tides were removed from the two datasets and only the sea level oscillations due to meteorological forcing were compared against. We have also analyzed the impact of the two tidal corrections (GOT00.2b and FES2004) and wet tropospheric corrections (MWR and model) in the altimeter time series. The comparison between altimeter and in-situ time series shows that ascending pass no. 373 gives correlation coefficients lower than those observed using descending pass no. 446 along the two track segments (Figure 1). The closest altimeter measurement to the coast on pass 446 gives unreliable estimates of the sea level. From the results obtained, our first preliminary conclusions are: (i) The combination of the tidal correction FES2004 and the model wet tropospheric correction gives the higher correlation for the two passes analyzed; (ii) The land contamination on the last 'ocean' altimeter measurement on pass 446 is the responsible of the lowest correlation coefficient obtained on that point. It is a matter of investigation why the correlation coefficients on pass 373 are lower than those estimated on pass 446.

Key words: Altimetry, Tide Gauge, Gulf of Cadiz, Validation.

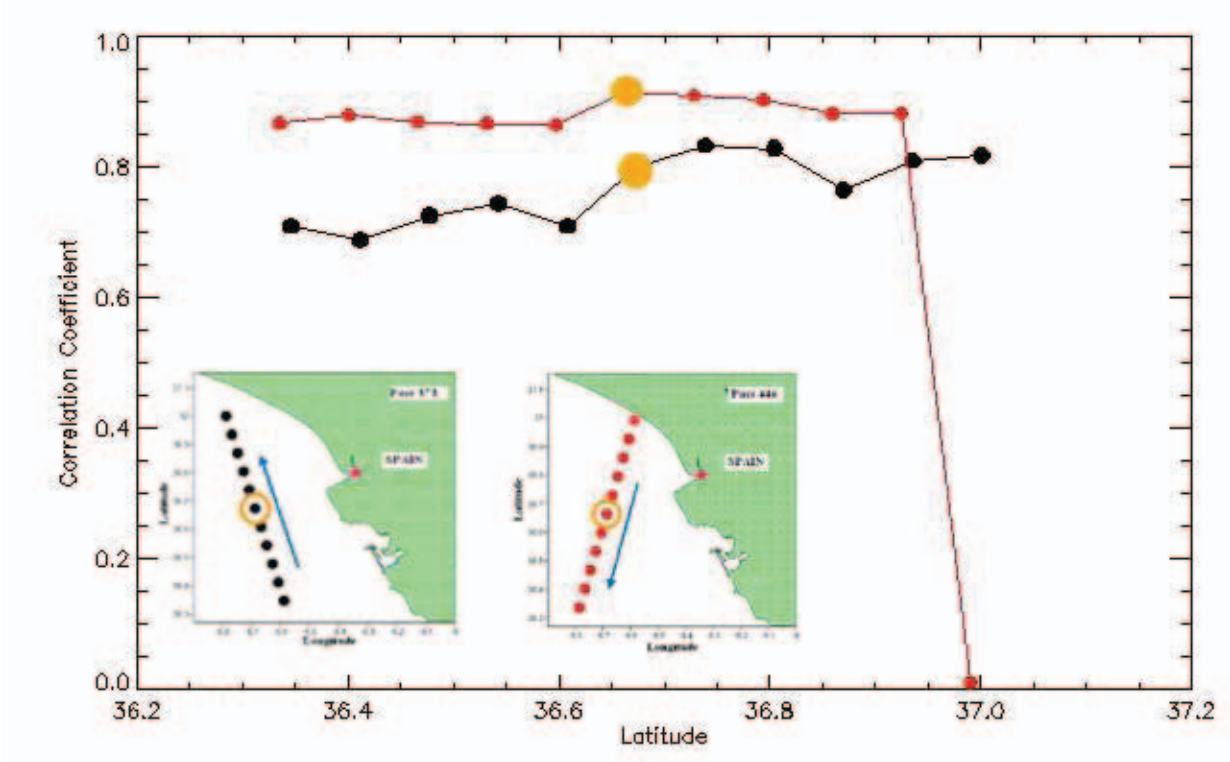

Figure 1.- Spatial distribution of the correlation coefficients (in-situ data vs. altimeter data) for track 373 (black line) and track 446 (red line). The location of the two passes along the Gulf of Cadiz is also represented.

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