VALIDATION OF ENVISAT RA-2 COASTAL-ORIENTED ALTIMETER DATA IN CHALLENGING ZONES: THE STRAIT OF GIBRALTAR♪

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A new prototype retracker -ALES- has been developed aiming at improving the radar altimeter measurements in the coastal zones. In this work, we show its performances in one of the most challenging sites around the world for coastal altimeter comparisons against in-situ data: the Strait of Gibraltar (located between south-western Europe and Africa).

DATA REJECTION
Chirp Bandwidth: only 320MHz.
'Bad' corrections: mainly SSB.
Outliers: SLA out of [-1.5 1.5] (m).

$$SLA\_Alt = Orbit - Range - Corrections - MSS$$

Range
ALES (Passaro et al., 2014) & SGDR (Brown, 1977)
Corrections
Ionospheric (GIM maps), Dry/Wet Troposheric (ECMWF model), Sea State Bias, Ocean Tide, Load Tide, Solid Earth Tide, Pole Tide and atmospheric effects (DAC). Regarding tidal elevation we used DTU10 global ocean tide model (Andersen 2010).
MSS
The most updated version of the Danmarks Tekniske Universitet MSS: DTU13 (Andersen and Knudsen, 2009; Andersen, 2010).
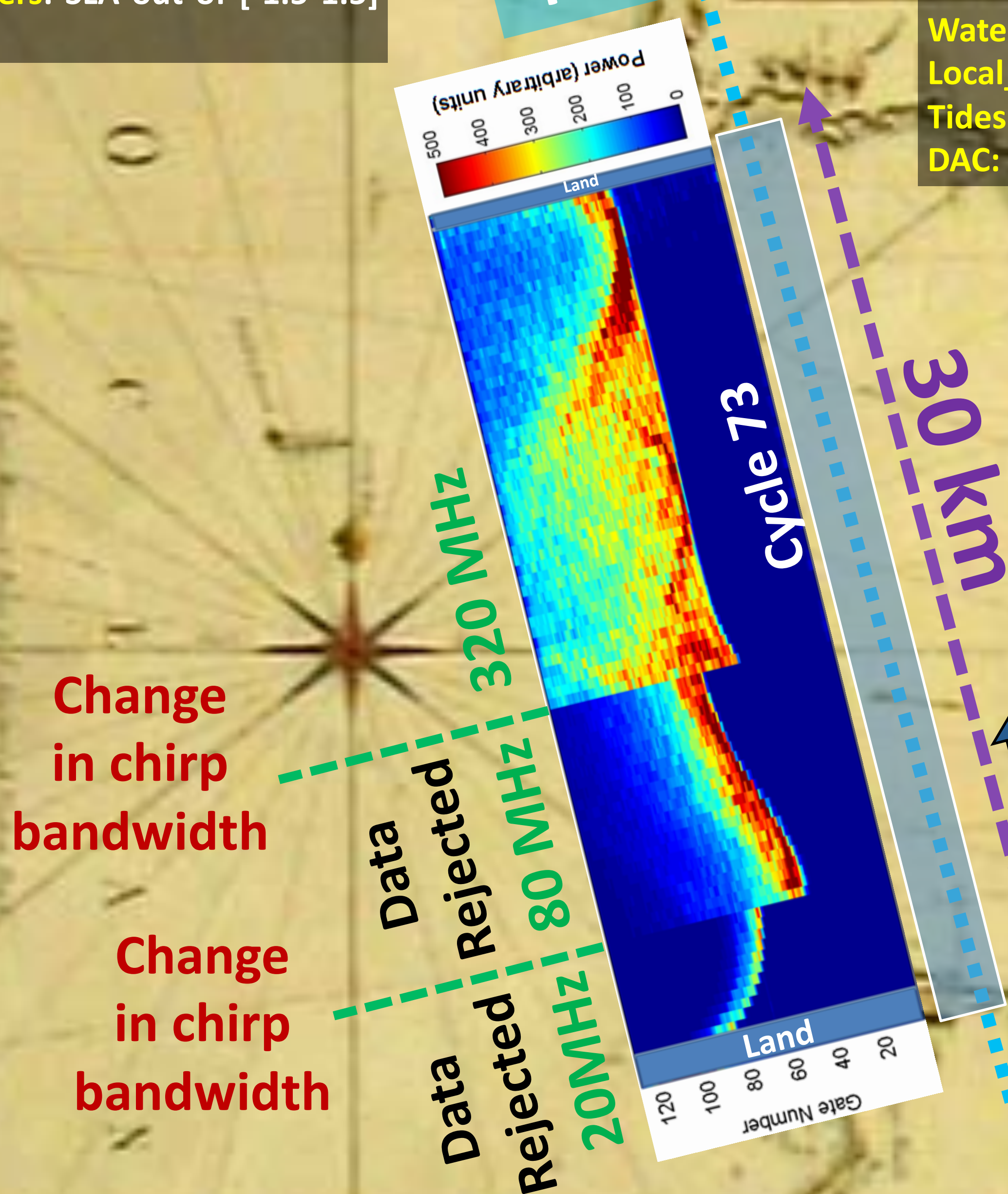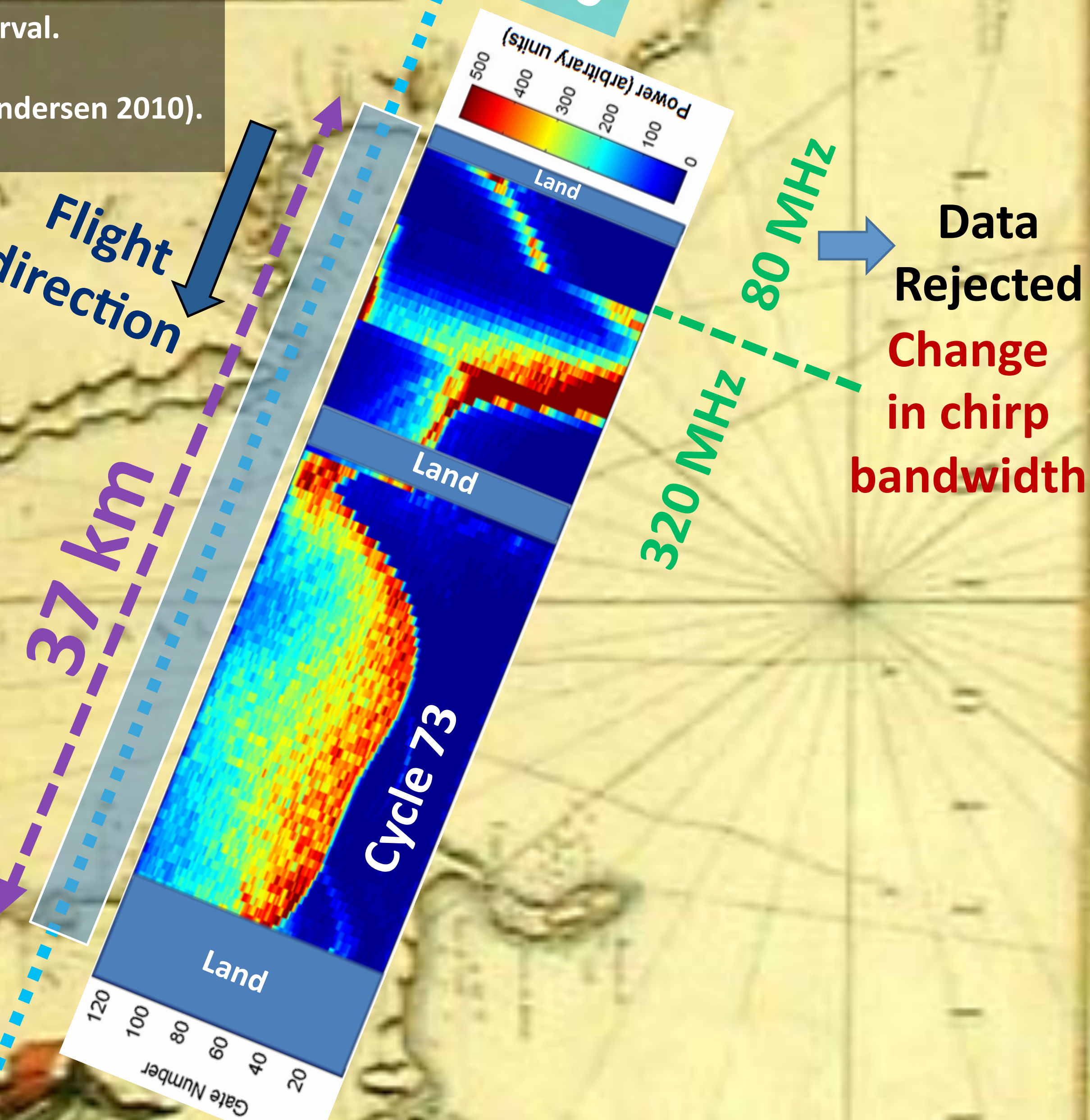
$$SLA\_TG = Water\ Level - Local\_MSS - Tides - DAC$$

Water Level: sea level recorded at a 5-minute interval.
Local_MSS: mean sea level over TGZ (1990-1999).
Tides: we used DTU10 global ocean tide model (Andersen 2010).
DAC: Dynamic Atmospheric Correction (ENVISAT).

Two segments along two ENVISAT RA-2 passes have been analyzed. Time series (10 years) of Sea Level Anomaly based on the Ranges obtained with ALES and SGDR (based on Brown's theory) have been compared against a tide-gauge located at Tarifa (south-western Spain) located at about 14 km from both tracks.

Ascending Track #0831

Descending Track #0360

30 km · Cycle 73 · 320 MHz · 80 MHz · 20MHz · Change in chirp bandwidth · Change in chirp bandwidth · Data Rejected · Land

37 km · Cycle 73 · 320 MHz · 80 MHz · Data Rejected · Change in chirp bandwidth · Land

EUROPE
Flight direction
'Tarifa'
TG
Strait of Gibraltar
Flight direction
AFRICA

Ascending track #0831 · Land (Africa) · Flight direction · Land (Europe) · RMSE (ALES) · RMSE (SGDR) · RMSE (m) · Latitude (°N)

Descending track #0360 · Land (Africa) · Flight direction · Land (P. Carnero) · Land (Europe) · RMSE (ALES) · RMSE (SGDR) · RMSE (m) · Latitude (°N)

Conclusions
Ten years of Envisat RA-2 SLA has been compared against in-situ measurements in the Strait of Gibraltar. The RMSE in the strait is about 0.20 m (ascending and descending tracks) and 0.39 m in Algeciras Bay.
The land-to-ocean transitions are more problematic than ocean-to-land showing higher RMSE.

References
•Andersen, 2009
•Andersen and Knudsen, 2010
•Brown, 1977
•Passaro et al., 2014