In this poster, we focus on the characterization of Significant Wave Height from different altimetric missions like ENVISAT, Jason-1, Jason-2, Topex/Poseidon, ERS-1, ERS-2, GFO and Cryosat-2. Their behaviour is analysed and characterized in terms of long term and interannual trends. For a finer analysis, comparisons to ECMWF ERA Interim model (Abdalla and Hersbach 2004) were also used as an external reference.

The criteria of validity adapted to SLA are not necessarily relevant for SWH purpose. For instance a measure without radiometer maybe degraded in term of Surface Height whereas it has no impact on SWH quality.

For this study, a selection of data with the following criterias is defined: SWH maximum = 20 m, Ice zone recognition Maneuver period recognition, The criterias selection impacting the height determination were relaxed.

In order to compare the different missions to each other, the analysis are performed for latitudes between -66° et 66° in statistical boxes of 2°x2° Latitude/Longitude, over 10 days periods.

The long term trend multimission and comparison with ERA model
In order to compare the different missions to each other, the analysis are performed for latitudes between -66° et 66° in statistical boxes of 2°x2° Latitude/Longitude, over 10 days periods. The figure on the right shows the superposition of the long term analysis for altimeters data at the bottom and the ECMWF ERA model at the top. We introduced a 50 cm bias for more lisibility.

The ECMWF ERA model at the top. We introduced a 50 cm bias for more lisibility.

The model ERA-Interim of ECMWF presents some limits to SWH study. For instance the ERA model does not present the anomaly for Topex. The figure at the top shows ERA model is not the same for each mission especially between ENVISAT and Jason-1. This comparisons underlines some discontinuities in the model.

The maximum intercorrelation between this 2 missions depending on time was maximising the correlation between both missions (500 days for the example of ENVISAT and Jason-1). Averaged over this period, the physical information is more correlated and would ease the computation of a multimission product.

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The long term trend of the difference SWH (homogeneous -ENVISAT V2.1 reprocessed data -SWH ERA-Interim for the whole mission ENVISAT is visible on the top figure.) -The blue zone is the beginning of the mission and is significant of some already suspected problems. -The green corresponds to the Side B period. -The jump in January 2010 corresponds to the beginning of the ENVISAT reprocessing. The model is not homogeneous and assimilates non reprocessed real time data. On the figure at the bottom, the same jump is present with the same variations on Jason-1 than on ENVISAT. The inhomogeneity of the data assimilated in the models affect the model and the monitoring of all the others missions.

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In DUACS system, wave/wind products already exist in real time corrected approximatively by a bias between missions but they could be complemented by a more stable products, with a finer multimission merging for more relevant climate orientated studies.

Conclusion
The model ERA-Interim of ECMWF presents some limits to be a stable reference for climatic studies because of the assimilation of inhomogeneous altimetric data. ⇒ Utility of building a homogeneous SWH product in order to be assimilated by models for climatic studies

References:
Ray et Becley pour identification erreur topex sur vagues Ablain pour étude climatique sur vent