# **Does Swell Impact SWH from SAR Altimetry?**

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# Does Swell Impact SWH from SAR Altimetry?



# We do not know for sure the answer! ③

But...

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# ... we have few clues saying:





# SARvatore -SAR Versatile Altimetric Toolkit for Ocean Research & Exploitation

- Based on SAMOSA/SAMOSA+ ocean model.
- Covers only:
  - North Atlantic box (32 °N to 70 °N & 20 °W to 0 °): 6 Sep. 2010 30 Jun. 2014.
  - Pacific box (2.5 °S to 25.5 °S & 160 °W to 85 °W): 7 May 2012 30 Jun. 2014.
- Only 1-Hz data are considered.
- Validation against ECMWF model and in-situ measurements.



## CryoSat-2 in SAR Mode



SWH comparison of Cryosat SAR mode against ECMWF model (left) and in-situ observations (right) in NE Atlantic. Period: September 2010 till June 2014.



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# SWH bias and st. dev. of difference (SDD) between altimeters and the model FG in NE Atlantic.



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## Estimates of absolute SWH error in the NE Atlantic for 2013



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SWH comparison of Cryosat SAR mode (left) and Jason-2 (right) against the ECMWF model FG in the S Pacific Box. Period: September 2010 till June 2014



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#### Concluding Remarks (from one of my earlier presentations)

- Preliminary results show that wind and wave products from the Cryosat-2 SAR mode are of good quality.
- Both products are comparable with those from Jason-2.
- The error in Cryosat-2 SAR mode significant wave height during the summer seems to be higher than that of Jason-2 and the model. **Question**: Is it possible that swell, which dominates the NE Atlantic ocean wave climate in the summer, has an adverse impact on the SAR-mode SWH (or wave form)?



### Sentinel-3A

- Launched in Feb. 2016.
- Sentinel-3A SRAL operates in SAR mode (exception: two days in April 2016).
- Sentilel-3 data
- Before the latest IPF change (few days ago), SWH needed slight enhancement.

## Variation of the Relative Difference w.r.t. Swell Ratio



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## Variation of the St. Dev. of Difference (SDD) w.r.t. Swell Ratio



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# Variation of the St. Dev. of Difference (SDD) w.r.t. Swell Ratio in the S Pacific Box of Cryosat



### **Concluding Remarks**

• There are few clues that swell has a negative impact on SWH from SAR altimetry.

 As far as SWH is concerned, it seems that altimetry in general performs better in swell dominated regimes compared to wind-sea dominated. But SAR altimetry is less successful at swell regimes.





### Variation of the Difference w.r.t. Swell Ratio



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