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Thanks to the CryoSat-2 instrumental capacity to downlink unprocessed Full Bit Rate (FBR) data, different data processing strategies can be attempted and implemented on ground.
This is particularly helpful, when operating in the coastal zone, inland water or land. It seems sensible to have SAR-processed echoes treated at highest repetition frequency possible in order to capture all the short scale variability of the coastal scenario.
In the Delay-Doppler processing algorithm, the parameter controlling the echo posting frequency is the grid space step that conventionally has been fixed at frequency of 20 Hz (300 meter) in order to match the instrument along track resolution, but the grid space step can be arbitrarily defined to any desired value.
In the present work, we will attempt to Delay-Doppler process the FBR data with a finer space step -around 80 meter, that corresponds to a frequency of 80 Hz (Burst Repetition Frequency)- and we will try to quantify the improvement, in term of precision and in term of observability of short scale signals, that is achieved from usage of that finer space step. It is worth to notice that, whereas the grid space step shrinks from 300 meters to 80 meter, the theoretical along-track resolution of 300 meter will remain unaltered.
Once that the L1B SAR echoes have been generated at 80 Hz, they will be re-tracked at 80 Hz using the SAMOSA model in order to retrieve the geophysical quantities: Sea Surface Height (SSH), Significant Wave Height (SWH) and Wind Speed at 10 meter (U10).
The experiment will be run in the waters of the German Bight (Wadden Sea) and Northern Caspian Sea and it will consist in processing the same FBR dataset at 20 Hz (standard grid case) and at 80 Hz (overgrid case) and in spotting the differences between the two cases in term of statistics and resolving power.
The current work is a feasibility study, preparatory for the data exploitation of the Sentinel-3 Topography Mission over coastal zone and inland water.
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