Envisat Radar-Altimeter Individual Echoes: preliminary geophysical results of the retracked RA2 individual waveforms over various surfaces

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The ENVISAT Radar Altimeter, in its nominal operation, provides averaged waveforms at the rate of 18 Hz (one averaged waveform over 100 individual echoes, or every 55.7 milliseconds). It has also the capability to provide limited bursts of individual, unaveraged echo samples data in phase (I) and quadrature (Q), at the full rate, 1800Hz . These individual echoes are not processed on-board in the same way the nominal 18 Hz RA-2 waveforms are. The needed processing is performed on-ground by means of a processor implemented ad-hoc to provide the users with reconstructed individual echoes. The Individual Echoes, once fully processed and instrument calibrated, are ready for validation and science exploitation purposes. The aim of this paper is to show preliminary results obtained by retracking the Individual echoes waveforms and analysing the main geophysical output parameters (range, SWH and sigma0) with different types of retrackers. The results shall then be compared with the ones obtained with the averaged waveforms for the same locations. The following available Envisat RA2 retrackers will be used to process the individual echoes waveforms: __ Ocean retracker: optimised for ocean surfaces, and based on a fit of the waveforms with the Hayne model, __ Ice1 retracker: optimised for general continental ice sheets, it employs an Offset Center-of-Gravity parametrisation of the echoes to calculate tracker offsets, __ Ice2 retracker: optimised for ocean-like echoes from continental ice-sheet interior, and based on the Brown model, __ Sea-ice retracker: optimised to estimate a tracker offset for narrow peaked (sea-ice) echoes.

With these results we'd like to raise awareness on this unique and novel dataset and encourage making further use of this data for new scientific research in ocean, dry land, surface water and cryosphere.