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CRUCIAL: CryoSat+ Land and Inland Water

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The CryoSat-2 SIRAL altimeter presents a unique opportunity for inland water height retrieval. In order to maximise the potential of this new dataset the ESA CRUCIAL (CryoSat+ Land and Inland Water) contract has been set up to investigate the application of CryoSat-2 data over land and inland water.
When operating in SAR mode CryoSat-2 obtains waveforms at an unprecedented resolution alongtrack, allowing far smaller inland water targets then previously possible to be acquired. Prior work performed with the Envisat Individual echoes has shown that a high Pulse Repetition Frequency (PRF) allows successful measurements to be obtained from river targets as small as 25m across. SAR Full Bit Rate (FBR) data are acquired over the Mekong River area, including the Mekong Delta itself. This region provides the ideal test-bed for obtaining small target inland water measurements and early results of FBR waveform reconstruction and analysis are presented within this paper.
Whilst FBR data over land are available in a few test regions, over much of the Earth's land surface measurements are acquired in Low Resolution Mode. These data are comparable to those obtained by conventional altimeters, such as ERS-2 and EnviSat. The non-repeat orbit of CryoSat-2 presents a new challenge to inland water measurement by satellite radar altimetry, as repeat time-series are no longer possible. However, CryoSat-2 data produce stage measurements from along the course of rivers more regularly than the 35-days of previous ESA missions. New methodologies must be investigated to allow hydrologists to harness the full benefit of these new data. This paper presents initial findings of investigations over major river systems captured in LRM mode and a first look at results over the Mekong area from SAR FBR. This additional data will also be used to enhance and improve the Altimetry Corrected Elevations (ACE2) Global Digital Elevation Models.