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CryoSat-2 SAR and SARin Inland Water Heights from the CRUCIAL Project.

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CRUCIAL is an ESA/STSE funded project investigating innovative land and inland water applications from Cryosat-2 with a forward-look component to the future Sentinel-3 and Jason-CS/Sentinel-6 missions. The high along-track sampling of Cryosat-2 in its SAR and SARin modes offer the opportunity to recover high frequency signals over inland waters. A methodology has been developed to process the FBR L1A Doppler beams to form a waveform product using ground cell gridding, beam steering and beam stacking. Inland water heights from Cryosat-2 are derived by using a set of empirical retrackers formulated for inland water applications. Results of the processing strategy will include a comparison of waveforms and heights from the burst echoes (80 m along-track) and from multi-look waveforms (320 m along-track). SAR and SARin FBR data are available for the Amazon, Brahmaputra and Mekong for 2011-2015. FBR SAR results are compared against stage data from the nearest gauge. Heights from Tonle Sap are also compared against Jason-2 data from the United States Department of Agriculture. A strategy to select the number of multi-looks over rivers has been designed based on the rms of heights across Tonle Sap. Comparisons include results from the empirical retrackers and from waveforms and heights obtained via ESA's Grid Processing on Demand (G-POD/SARvatore) using the SAMOSA2 retracker. Results of FBR SARin processing for the Amazon and Brahmaputra will be presented including comparison of heights from the two antennae, extraction of slope of the ground surface and validation against ground data where appropriate.