

Arctic and Antarctic Sea-Ice Freeboard and Thickness Retrievals from CryoSat-2 and EnviSat

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The CryoSat-2 satellite is now in the 6th year of data acquisition. With its synthetic aperture radar altimeter, CryoSat-2 achieves great improvements in the along track resolution compared to previous radar altimeter missions like ERS or Envisat. The latitudinal coverage contains major parts of the Arctic marine ice fields where previous missions left a big data gap around the North Pole and especially over the multiyear ice zone north of Greenland. With this unique data set, changes in sea-ice thickness can be investigated in the context of the rapid reduction of the Arctic sea-ice cover which has been observed during the last decades.

We present the current state of the CryoSat-2 Arctic sea-ice thickness retrieval that is processed at the Alfred Wegener Institute and available via seaiceportal.de (originally: meereisportal.de). Though biases in sea-ice thickness may occur due to the interpretation of waveforms, airborne and ground-based validation measurements give confidence that the retrieval algorithm enables us to capture the actual distributions of sea-ice regimes.

Nevertheless, long time series of data retrievals are essential to estimate trends in sea-ice thickness and volume. Today, more than 20 years of radar altimeter data are potentially available and capable to derive sea ice thickness. However, data originate from satellites with different sensor characteristics. Therefore, it is crucial to study the consistency between single sensors to derive long and consistent time series. We present results from the tested consistency between Antarctic freeboard measurements of the radar altimeters on-board of Envisat and CryoSat-2 for their overlap period in 2011.