Comparison of GNSS-SNR from different antenna types

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The GNSS signal-to-noise ratio (SNR) is nowadays used in many application for the estimation of the distance between the antenna and the reflecting surface. Additionally, some important surface characteristics like roughness or soil moisture can be derived from the oscillation of the SNR data. Besides some other parameters, the SNR modulation depends on the properties of the receiving antenna, mainly the antenna phase and gain pattern.

Commonly, geodetic antennas are used for the estimation of reflector heights and surface properties. For investigations using a larger number of sensors in a particular area of investigation, it might be of major interest to use cheaper antenna types. Hence, it would be desirable to have some more information of the influence of the antenna quality on the SNR data.

The authors carried out a field experiment at the German North Sea coast with four different antenna types connected to the same receiver type that collected simultaneously SNR data from the same reflecting water surface at three consecutive days. The data for every day was analysed using an interference pattern technique based on global optimisation using interval analysis yielding the reflector height and its tidal variation together with an attenuation factor.

The quality of the data sets from the different antenna types is investigated and the results are presented together with some recommendations.