

Measurements of Surface Currents in the German Bight utilizing High Frequency Radars

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The HF-Radar network in the German Bight (figure 1) consist of three Wellen Radar (WERA) Systems, which are located on Sylt, Büsum and Wangerooge. All Systems transmit via a rectangular array of four antennae with an average power of 32 W. The Systems on Sylt and Büsum operate at 10.8 MHz with a linear receive array consisting of 12 antennae, while the Wangerooge radar operates at 12.1 MHz with a 16 antennae array. Each radar covers a 120° field of view with a 3° azimuth and 1.5 km range resolution. All systems are operated continuously with an hourly program, where 58 minutes are for measurements and the remaining 2 minutes are utilized to find the best suited frequency around the selected frequency band. The acquired data are preprocessed at each radar site and than forwarded to the main server at HZG in Geesthacht were the final products are generated and uploaded to the COSYNA data base.

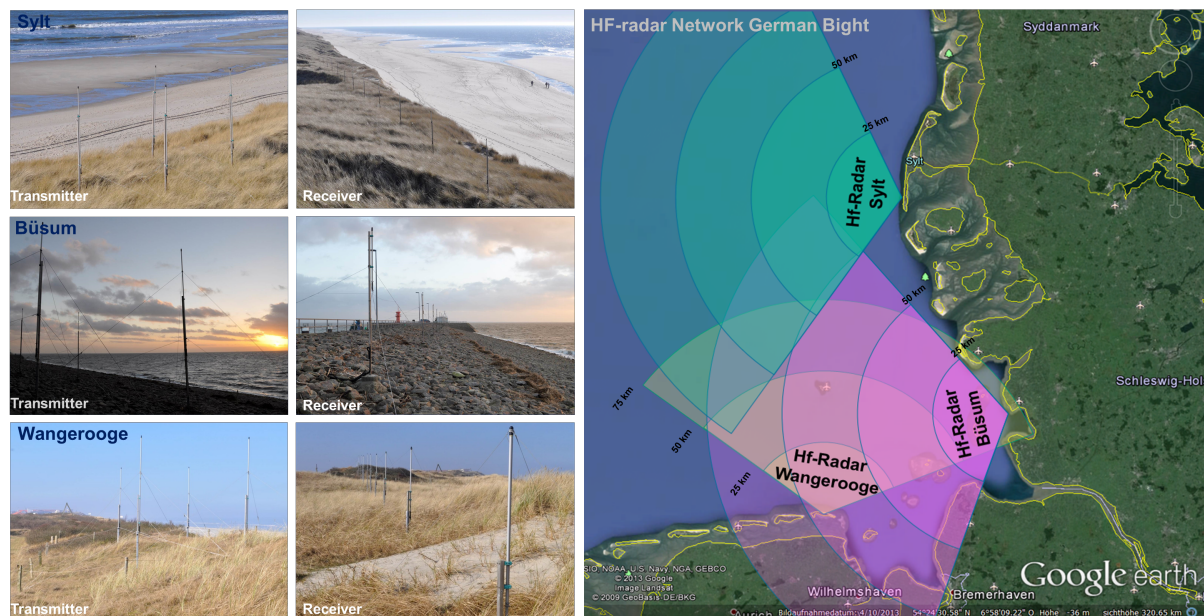


Figure 1: The photographs show the setups of the German HF-radar network consisting of the transmit and receive antenna arrays on Sylt, Büsum and Wangerooge. The map depicts the coverage and overlap of the radar sites.

The radial component of the ocean surface current with respect to the radar look direction is retrieved at each radar site utilizing 20 minutes of data. These components typically cover a range distance of 100 km within the azimuth of 120° covered by the radar (figure 2). The surface current components are forwarded to the main server at HZG where the data are subject to quality control and fused to a surface current vector field (figure 2 right hand side). The radar network resolves surface currents every 20 minutes, which are made available on the COSYNA web portal within 30 minutes of acquisition (<http://codm.hzg.de/codm/>).

The data are organized in daily netCDF files. The first file is from 2010. The measurements are ongoing and will be added in PANGAEA as complete years.

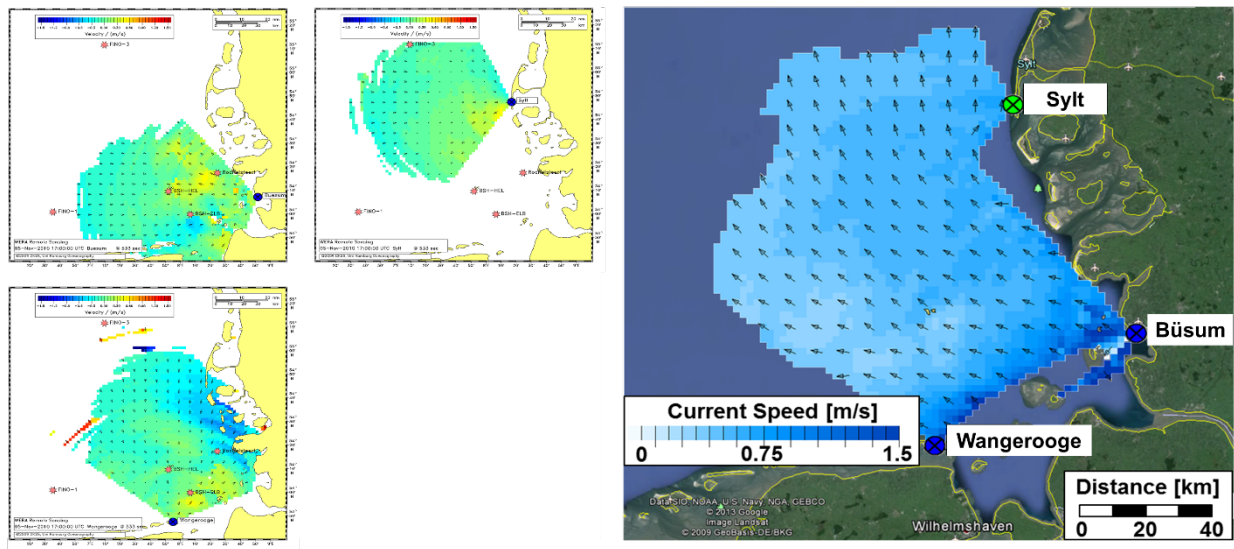


Figure 2: On the left hand side a typical example of the surface current components of the individual radars Sylt, Büsum and Wangerooge are depicted. The right hand side shows an example of a 20 min mean current field resulting from all three radar sites.