



NVD
Rit

Technical Report / Tøknifrágreiðing

**A RDCP600 current and wave
recorder to NVD**

Ein RDCP600 streym og aldumátari til NVD

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Introduction

The relative strong tidal currents and harsh wave climate on the Faroe Shelf affects all marine operations. In order to increase the knowledge about the physical marine environment around the Faroe Islands and to develop reliable current and wave simulation and forecasting systems the Faculty of Science and Technology (FST) in collaboration with other institutes has initiated a research and development programme, which includes projects on numerical simulation of the tides, operative wave model, tidal prediction system, development of fish farming equipment, understanding of the circulation on the shelf and in local fjords, spread of waste, understanding of the production capability on the Faroe Shelf and improvement of search and rescue feasibility.

Of significant importance for all these projects are reliable measurements of the physical parameters, in particular currents, water level and wave height. The Fishery Laboratory and the Office for Public Works on the Faroe Islands has conducted this type of the measurements in several years, and in recent years also private companies has performed water level and current measurements. The majority of these data are kindly made available to FST by the originators of the data. However, most of these data are measured for a particular purpose like in the planning of harbors or fish farming sites and are in most cases not optimal for the ongoing research and development projects.

The objective of this project is to intensify the ongoing activities at FST and cooperating institutes by upgrading the instrumentation at FST with current and



Figure 1: The purchased RD600 from Aanderaa Instruments.

pressure recorders, and to perform a measurement programme in Faroese sounds and channels.

The funding approved by BP-Amoco Exploration as partial funding of this project is used to upgrade the instrumentation with a combined bottom mounted Acoustic Doppler Current Profiler (ADCP) and wave height recorder. This report provides a brief description of the instrument and some details from a test deployment.

Bottom mounted ADCP with water level and wave height recorder

This instrument is mounted on the bottom and measure the current profile in the water column above, and also the water level, wave parameters and temperature at the instrument depth. This type of instruments is well suited to perform measurements in areas, where traditional

point measurements mounted on a mooring rig is impossible due to strong currents.

The purchased instrument is of the type RDCP 600 from Aanderaa instruments in Norway (Figure 1). This is a 600 kHz medium range selfrecording acoustic Doppler profiler equipped with a temperature sensor and a high accuracy quartz based pressure sensor for depth and wave hight measurements.

The current profiler has the capability to measure water columns up to 2000 m, but the purchased housing is only suited for depths up to 300 m. The quartz based pressure sensor is not designed for depths deeper than 70 m. However, deployments including wave measurements deeper than about 50 m are not likely due to the attenuation of waves with depth.

The choice of this product is based on its ability to relate the current profile to the water surface instead of the instrument, reports of stabel functionality, the post-processing software and price.

The instrument was delivered with a frame for bottom mounting, which was bolted onto a 700 kg heavy concrete block with holdings for deployment and recovery (Figure 3). The holdings and the reinforcement in the concrete is made of stainless steel, which does not influence the compass in the instrument.

Test deployment

The instrument was deployed at 45 m depth in the vicinity of a fish farm installation in Funningsfjord on the 2'th of July, 2004. The positioning of the frame on the bottom was checked by lowering a video camera down to the instrument



Figure 2: Funningsfjord. The test deployment was conducted close to the fishfarm seen along the coast on the more distance side of the fjord.



Figure 3: The instrument mooring frame in position at 45 m depth in Funningsfjord. The instrument frame is bolted on a concrete block equipped with suitable holdings for deployment and recovery.

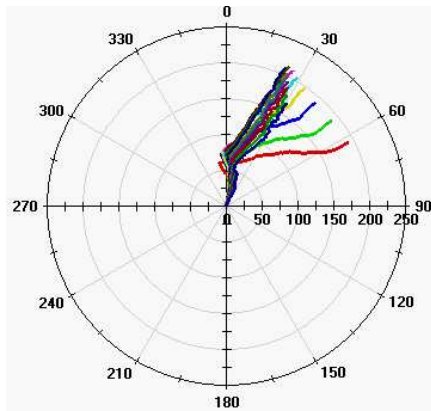


Figure 4: Progressive vector diagram of the current measurement for every 2 m from 6 m to 36 m depth in Funningsfjord. Red is at 6 m, green at 8 m and blue is at 10 m (Magnetic direction) for the period 07.07-21.08 2004

(Figure 3). The video camera survey unveiled some conflicts with the mooring of the fish farm. Based on this the instrument was taken up to the surface and re-deployed at another position nearby on the 7th of July. This position turned out to be very close to some of the anchors holding the fish farm installation, and the instrument was moved again on the 16th of July. The instrument was recovered on the 5th of the September.

The instrument worked properly until the 21th of August, when the batteries run out, and provided the current profile from bottom to 6 m depth in 2 m bins (Figure 4), the surface current, water level (Figure 5) and wave data (Figure 6) from this position. Detailed description of these measurements will be provided elsewhere.

Conclusion

An RDCP600 from Andraaa Instrument in Norway, which includes an acoustic current profiler, temperature sensor and a pressure wave measuring cell is purchased. A test deployment is conducted, which demonstrated that the instrument works as expected.

Acknowledgement

The RDCP600 was funded by BP-Amoco Exploration, Faroes. The steel work was performed by the engineer at the Faroese Aquaculture Research Station, Nesvík, and the concrete work by Øystein Patursson at FST. The deployment and recovery was done with the service boat Rávan own by P/F East Salmon. Valuable assistance and information was provided by the crew members. Kristian Zachariassen at the Faroese Fisheries Laboratory operated the video camera and provided valuable assistance during the deployment.

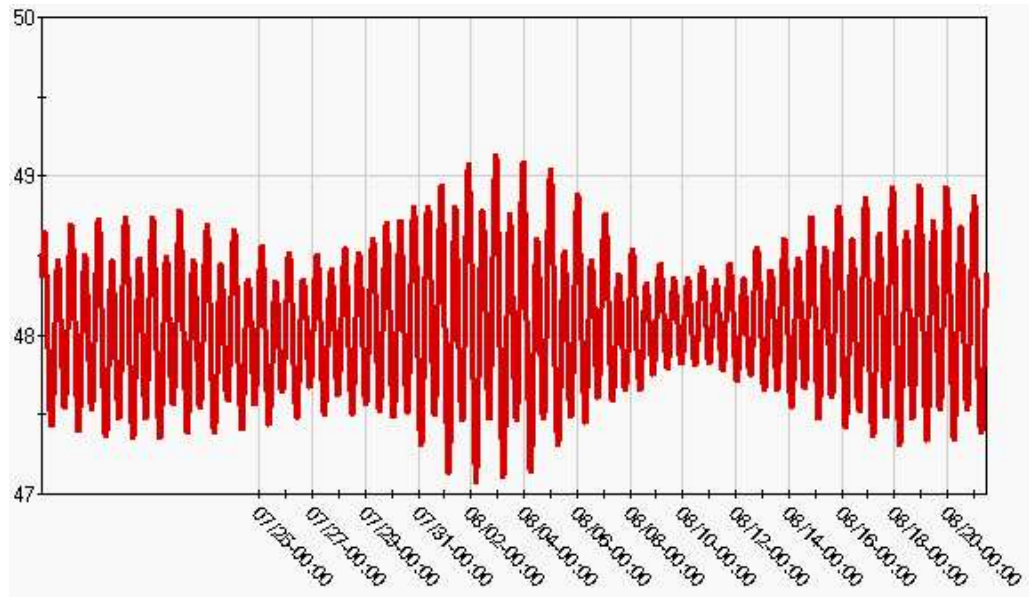


Figure 5: Time series of the measured water level for the period 16.07-21-08 2004.

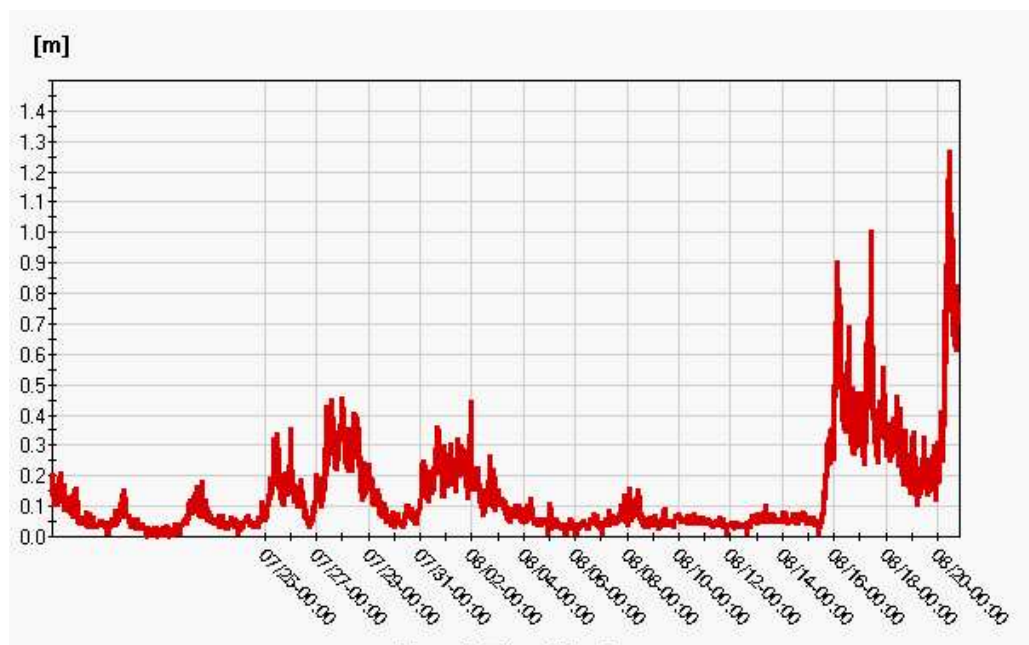


Figure 6: Time series of the measured maximum wave height for the period 16.07-21-08 2004.