

## **IMPACTS of research BUDGET reduction on ACOUSTIC FISH abundance estimation SURVEYS**

Fannie Shabangu\*

\* Department of Agriculture, Forestry & Fisheries

### **Abstract**

Research costs are constantly rising world-wide, research institutes are often bound to conduct research in bad weather conditions. Fish density accurate estimation made via acoustic echo integration is problematic in bad weather conditions due to acoustic signal attenuation by waterborne air bubbles and vessel movement, which result in an underestimation of fish abundance. Correction factors have as yet not been established experimentally to account for acoustic signal attenuation in bad weather conditions. In this study, the nautical area backscattering coefficients (NASCs) of corrugated and flat sea beds were measured by three 38 kHz split beam Simrad EK60 echosounders during different weather conditions (calm, moderate, and bad). The ratios of integrated sea bed NASCs under these different weather conditions were evaluated in order to estimate correction factors for acoustic signal attenuation. Vessel roll and pitch were also used as an index of acoustic signal attenuation at a given wind speed, wave size, and vessel-encounter angle. Results show that stable sea bed NASC ratios are found during periods of low (0-10 ms<sup>-1</sup>) wind speed, whereas at high wind speeds of around 30 ms<sup>-1</sup> a multiplicative correction factor of 2.3 must be applied. The results also suggest that acoustic signal attenuation is vessel specific, and that transducer mounting position and vessel hull shape influence such attenuation. Therefore, the established correction factors for surveys conducted in bad weather should improve the data quality for sustainable fisheries management.