A revised estimate of the Denmark Strait Overflow

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The Denmark Strait Overflow is a major contributor to the deep branch of the Atlantic Meridional Overturning Circulation. It has now been monitored for two decades, using one or two moored acoustic current profilers deployed at or near the sill. We have recently verified that some of those instruments were affected by a low-velocity bias in the lower part of the water column. A serendipitous double deployment in the Faroe Bank Channel allowed us to develop a robust correction scheme for this bias. The implementation of the correction scheme leads to an increase of about 15% in the average strength of the overflow. The overflow transport was traditionally estimated from one or two profiles using a regression derived from a high resolution regional model. In the summer of 2014, an extended array using five moorings was deployed with the aim of better resolving the horizontal structure of the overflow plume, namely its extension towards the Greenland shelf. The resulting picture after recovery of the array in 2015 is of a very dynamic overflow, with the current structure stabilizing only when averaging over 10-15 days or longer. The improved instrumental coverage also allows a transport estimate based on observations alone. This new method, together with the bias correction, yields an increase of about 10% in the strength of the overflow, but a decrease in its transport variability. The latter is due to compensating changes in the different moorings that could not have been detected with the lower horizontal resolution previously used.