



Spectral decomposition of deep flow variability at the Greenland-Iceland-Scotland Ridge and the Labrador Sea Western Boundary

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Almost two decades of observed transports in the subpolar deep branch of the Atlantic Meridional Overturning are available. However, the time series - especially in the Denmark Strait and Labrador Sea - show gaps of considerable length. Linear or polynomial interpolation can introduce spurious periodicity at long periods. By using Statistical Singular Analysis (SSA) techniques, it should be possible to interpolate over data gaps in a spectrally consistent way.

We apply gap filling and forecasting techniques to three time series of observations of the deep AMOC with different characteristics. This allows us to restrict the spectral comparison between the data at most energetic spectral bands. The method is first tested by introducing artificial gaps in a model timeseries and then comparing the gap-filled results with those of the known original series. Since the Faroe Bank Channel observations do not have gaps longer than one month, the procedure is repeated with real observations and applied to the series with longer gaps. Since the only series with strong annual cycle is that of the FBC, only those modes representing energy in the interannual bands are discussed further. They reveal a variability maximum at periods between 3 and 5 years and near 10 years. For multidecadal variability which shows higher energy in climate models there is urgent need to obtain longer term observational data. On the other hand, forecasts for 3-5 years from existing data seem to be possible as is revealed by our simulations.