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Using in-situ thermistor string measurements in the Arctic sea ice to validate total surface energy flux in ERA-Interrim.

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We have used thermistor string measurements from two Ice Mass Balance (IMB) buoys to first infer the Arctic Sea Ice heat diffusivity, and then use these to estimate the near surface total heat flux in the ice during the winter season 2012-13. This flux is then compared with the corresponding total surface energy flux (i.e. sensible heat, latent heat, net short and long wave radiation) in the ERA-Interrim re-analysis data interpolated in time and space to the location of the buoys. It is found that difference between the ERA-interrim total flux (upward) and the corresponding flux in the upper part of the ice varies during the winter. We hypothesise that this varying bias in the ERA-Interrim is related to the treatment of sea ice in the IFS model. In the version used for ERA-Interrim, sea ice is enforced to have a fixed thickness of 1.5m whereas there is considerable seasonal variation in the actual thick thickness.