Convection is key to better polar low forecasts

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ECMWF HRES and Arome Arctic are the operational Numerical Weather Prediction models that forecasters in northern Norway use to predict Polar lows in the Nordic and Barents Seas. These type of lows are small, but intense mesoscale cyclones with strong, gusty winds and heavy snow showers. They cause hazards like icing, turbulence, high waves and avalanches that threaten offshore activity and coastal societies in the area. Due to their small size and rapid development, medium range global models with coarser resolutions such as ECMWF have not been able to represent them properly. This was only possible with short range high resolution regional models like Arome. When ECMWF introduced their new HRES deterministic model with 9 km grid spacing, the potential for more precise polar low forecasts increased. Here we use case studies and sensitivity tests to examine the ability of ECMWF HRES to represent polar lows. We also evaluate what added value the Arome Arctic model with 2.5 km grid spacing gives. For verification, we use coastal meteorological stations and scatterometer winds. We found that convection has a greater impact on model performance than horizontal resolution. We also see that Arome Arctic produces higher wind speeds than ECMWF HRES. To improve performance during polar lows for models with a horizontal grid spacing less than 10 km, it is therefore more important to improve the understanding and formulation of convective processes rather than simply increasing horizontal resolution.