ABSTRACT
(for the press)

Polar lows are perhaps the most dangerous weather phenomenon appearing along the coast of Norway. These small scale and intense cyclones hit both seafarers and coastal communities with strong winds and heavy precipitation, occasionally with fatal consequences.

The thesis shows that one commonly used theory for polar lows does not work. This can be shown thanks to recent flight measurements recorded by Norwegian researchers during the International Polar Year.

The thesis shows that a warmer sea surface leads to more intense polar lows. This can be shown using classic tropical cyclones theory. Polar lows appear, just like tropical cyclones, only over the open ocean. The effect by the sea surface temperature is however too weak to explain why polar lows are initiated, vary in intensity and finally decay.

The thesis shows that polar lows not only are affected by the ocean but that they also affect the ocean. The most important effect is caused by the strong winds, which mixes water down to a depth of 80 metres. This lifts warm water originating from the Gulfstream to the ocean surface where it is cold off. This can have implications on the global ocean circulation and climate.

The work on the thesis was conducted at the Norwegian Meteorological Institute during 2006 – 2008.