

## **IPY-THORPEX study suggests extreme Arctic weather to become more common**

A study suggests that extreme weather events in the Arctic will become more common as the winter ice cover retreats, with potentially severe consequences for human activity.



One of the most visible signs of climate change is the dramatically reduced ice cover in the Arctic. The retreat of the sea ice leads to rapid changes in the weather conditions in these areas. A new study published in *Climate Dynamics* reveals that regions that have been covered by sea ice until now will be exposed to new kinds of severe weather. This may have dire consequences for human activities in the Northern regions.

The study was led by a member of the International Polar Year project IPY-THORPEX (THE Observing system Research and Predictability EXperiment). The main focus of the project is to study extreme weather phenomena from the inside, with the purpose of acquiring new knowledge in order to improve weather forecasts.

### **Increased activity and more extreme weather**

Large increases in the potential for extreme weather events were found along the entire southern rim of the Arctic Ocean, including the Barents, Bering and Beaufort Seas. While these areas are sparsely populated, an increasing commercial marine activity is predicted there, paradoxically because the sea ice is set to retreat.

"One consequence of climate change is that new areas are uncovered, opening for commercial activities," said Dr. Erik Kolstad, at the Bjerknes Centre for Climate Change, who led the study.

At the same time, commercial activities in the North (e.g. fisheries, oil industry and shipping) will become increasingly vulnerable to extreme weather as the activities in these areas increase.

"It is important that we get better at forecasting these weather phenomena, in order to prevent the loss of human lives and environmental disasters in the future," Kolstad said.

In addition, the limited existing infrastructure for responding to maritime accidents in the Arctic must be strengthened. As Arctic sea ice declines and commercial activities in the region increases, this becomes increasingly important, according to a new report recently released by the University of New Hampshire and the National Oceanic and Atmospheric Administration in the US.

### **Cold air is the fuel**

Arctic weather has many faces. While the conditions over the Arctic Ocean ice sheet are frequently calm and cloudy, the warm regions with open ocean surrounding it are host to severe weather, such as explosive mid-latitude storms, polar lows and arctic fronts.

A common feature of these weather types is that they form when cold air masses wander out from over the ice sheets over the warm ocean to be heated from below. In the North Atlantic, such conditions arise frequently along the Gulf Stream and its northern branches. The North-East Atlantic (the Greenland, Iceland, Norwegian and Barents Seas) is particularly prone to marine cold-air outbreaks (MCAOs), as they are referred to in the paper.

### **Some good news**

As the sea ice in the Northern Hemisphere retreats rapidly, the regions with the highest frequency of MCAOs today are "pulled" towards the north. Thus, a projected decrease in the strength of MCAOs along the most densely populated coastlines was also found. This may prove to be good news for people along the coastlines of Norway, Iceland, the British Isles and Northern Europe in general.

### **Flew into extreme weather**

The IPY-THORPEX research team spent three weeks in the North of Norway and repeatedly flew into and over extreme weather conditions, using a high-tech aircraft to perform accurate measurements. The campaign yielded enormous amounts of new data.

The highlight of the field campaign was an unprecedented documentation of a "polar low", the arctic cousin of the tropical hurricanes, from beginning to end. The researchers have now started to scrutinize the data for hitherto unknown details about the many weather phenomena that were put on record during the campaign.

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*On February 25th 2009, the IPY Joint Committee will release a report on 'The State of Polar Research'. In the lead-up to this event, major IPY research projects are releasing information for the press, and making themselves available for media enquiries. A wide range of projects will be profiled reflecting the diversity of IPY. For more information, please visit [http://www.ipy.org/index.php?ipy/detail/feb09\\_projects/](http://www.ipy.org/index.php?ipy/detail/feb09_projects/) or contact Rhian Salmon ([ipy.ras@gmail.com](mailto:ipy.ras@gmail.com))*