Proposal 11

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IPY research themes proposed by the Danish Meteorological Institute (DMI).
It is noted that all these themes comply with the main IPY themes including
- *Research (new knowledge)*
- *Polar change*
- *Improved understanding of polar processes*

The proposed research themes deal with geophysical research themes only, but it is important to note, that all the themes have a direct and strong impact – and interacts – with other areas of research, including biological/ecological, political and social sciences. It will therefore be easy to integrate the research into somewhat larger interdisciplinary research themes.
It is generally suggested that the Danish activities within the proposed areas focus to the largest possible extent on Greenland. Thus, atmospheric measurement components (including those in the upper atmosphere) should be performed at the existing Greenland stations (lidar, ozone, radar, etc).
For most of the suggested research the main focus is naturally on Greenland and the Arctic region, but some themes are also directly related to the Antarctic region.
It is noted that the list is in non-prioritised order.

The Arctic Ocean and its relation to inter-decadal climate variations

It is well known that the polar and in particular the arctic multi-decadal climatic variability is larger than the level of climate variability at other latitudes.
This natural variability occurs as unforced variations internal to the climate
system and it is strongly related to variations in the hydrological cycle, which show up, for instance as variations in the water mass transformations
and other processes in the arctic waters bodies (including sea ice)
and in the strength of the thermohaline circulation in the Atlantic Ocean.
Also forced variations of climate, such as trends related to enhanced Greenhouse effect, tend to have the largest amplitude in the polar regions.
It suggested to perform modelling as well as data based theoretical studies of such variability to improve the understanding of the natural climate
variability, to put anthropogenic climate variations in perspective
and to investigate the possibilities for a new type of inter-decadal climate prediction system (a possibility suggested by new research).