THORPEX AND IPY ACTIVITIES IN ALASKA

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Abstract:
The International Polar Year (IPY) represents an international research effort to better understand the earth's polar regions, their changes, and the impacts of those changes on society as a whole, both within and outside of the polar regions themselves. In fact, some of the more important science needs with respect to the polar regions is understanding the linkages between changes in those regions and changes in the subpolar regions. To this end, NOAA has been integrally involved in planning for the 2007-2008 polar year, which will run from March 2007 through March 2009.

Much of the NOAA focus for the IPY relates to establishing and maintaining a long-term global and polar observation strategy to document the ongoing changes in the arctic, and to understand the impacts of those changes on weather and water, climate, ecosystems, and commerce and transportation (including important subsistence-related issues).

THE IMPORTANCE OF UNDERSTANDING CLIMATE CHANGE IN ALASKA

The pace of climate change in the arctic, including Alaska, has been well documented in the last several decades, as noted by surface temperature warming trends at locations across Alaska. The extent and thicknesses of multi-year sea ice has decreased, leading to more impacts from coastal storms in the spring and fall and numerous impacts to transportation, subsistence activities and hydrological issues. Fall freeze-up has been occurring later and Spring break-up has come earlier. Glaciers are retreating and permafrost is melting.

The impacts in Alaska to NWS service programs as a result of the climate changes are tremendous and varied. Aviation impacts include more frequent icing conditions, lower visibility, and altered flying "paradigms" for Alaskan pilots. The public has noted more frequent weather extremes. The marine environment has witnessed more frequent high-impact events, especially in areas of reduced sea ice. Coastal erosion and water quality impacts are the most notable concerns. Wildfires continue to have a very great impact in Alaska, as more variable moisture conditions have combined with the spruce-bark beetle infestation to contribute to record numbers of wildfires and acreage burned in each of the last several years. A greater variability in river volume has created increased flooding and erosion. Subsistence and cargo operations have been impacted by changing river flows, and ice-dammed glaciers have caused lake releases. Rising sea-levels may have eventual tsunami impacts, and resuspension of relic volcanic ash (ash deposited decades ago, now being exposed again due to glacier retreat) can cause many problems, especially for aviation and agriculture.

While understanding the relationship between climate change and these service program areas is important for Alaska, understanding the existence and strength of linkages between Alaska and the rest of the United States in an era of climate change is even more important. Thus, the NWS' support of NOAA's IPY activities is extremely relevant to the broader mission of NOAA as a service organization.

THORPEX AND THE IPY

Work to assess the relative importance of flow over the Pacific Ocean and "cross polar flow" to unpredictable flow regimes that affect the medium range forecasts over the United States will benefit studies associated with both THORPEX and the IPY. Collecting data over the polar region will be a key part of addressing these issues and would therefore facilitate an attempt to leverage the THORPEX and IPY programs against each other. THORPEX has pushed for the real time provision of the data because it facilitates conducting these experiments at the operational centers around the world at the lowest possible cost.

The WMO has proposed that THORPEX be the weather component of the IPY and a major organizing factor for IPY weather- and climate-related studies. Indeed, many US and international IPY proposals have been submitted that are directly linked to THORPEX. NWS Alaska Region is collaborating with Zoltan Toth and other THORPEX investigators on several proposals that will involve predictability and data sensitivity studies during the IPY.