Ice, Snow and Water in a Warming World

Call for Papers

The International Glaciological Society (IGS) will prepare a special issue of the Annals of Glaciology with the theme 'Ice, Snow and Water in a Warming World' in 2020. The issue will be part of Annals Volume 62 and will be Issue number 85.

The Chief Editor for this issue is Regine Hock (University of Alaska, Fairbanks)
Scientific editors are Christophe Cudennec (International Association of Hydrological Sciences, IAHS), Jeff Key (NOAA, UW-Madison), Douglas MacAyeal, University of Chicago and Tómas Jóhannesson (Icelandic Meteorological Office, IMO). Further editors will be appointed as needed.

Schedule for publication:

- 1 June 2020 - Submissions Open
- 1 December 2020 – deadline for submitting a manuscript to this Annals
- 1 June 2021 – deadline for supplying final accepted paper
- Accepted papers will be published online as soon as authors have returned their proofs and all corrections have been made.
- The hard copy is scheduled for the second half of 2021.

THEME

As a result of global atmospheric warming, all components of Earth´s cryosphere are now changing at a dramatic pace. More than a quarter of the planet´s land surface receives snow precipitation each year and declining snow cover in many parts of the world is causing concern for the future of wintertime recreation activities. Mass loss continues from glaciers and ice fields in all mountainous regions of the world and from Arctic and Sub-Arctic ice caps. The two large ice sheets in Greenland and Antarctica are major contributors to rising sea -level and may have begun to show signs of irreversible mass loss. The areal extent and thickness of Arctic sea ice cover continues to decline, and the resulting albedo changes are now believed to affect winter weather patterns in North America and Eurasia. Increasing attention is being given to hazards due to thinning of lake and river ice cover and permafrost degradation, including slope failure.

Topics of interest:

1. **Earth's snow cover:** Snow science, recent snow cover changes in mountain and polar regions; satellite monitoring of snow cover; GPR measurements of snow thickness; importance of snow cover for tourism; avalanche hazard mitigation.
2. **The cryosphere and hydrology:** Importance of snow and ice melt as a water resource for mountain region populations and for hydropower utilization; runoff changes due to atmospheric warming; impacts of thawing permafrost on the hydrological cycle; monitoring of changes in lake and river ice.
3. **Permafrost:** Nature and distribution; ongoing changes; impacts on the hydrological cycle; monitoring challenges; increased risks of landslides due to permafrost thawing.
4. **Ocean-cryosphere interactions:** Transfer of water between the oceans and snow and ice masses on land; changes in ocean heat content; effects of declining Arctic sea-ice cover on the climate system; effects of oceanic warming on tidewater glaciers; potential changes in

deep-water formation in the N-Atlantic Ocean; tipping points in the ocean-cryosphere system.

5. **Glaciers and ice caps:** Historical changes in glacier area and mass-balance all over the world; mass-balance measurements and modelling; glacier dynamics and evolution; melt processes and glaciohydrology; glacier outburst floods (jökulhlaups); glaciers in high-mountain areas and impacts of their melting on populations; future perspectives on glacial rivers as water resources.
6. **The Greenland Ice Sheet:** Age and history; deep ice core records; internal structure; recent changes; likely response to near-future warming; varying contribution of Greenland mass loss to sea level in different parts of the world´s oceans; research on surface melt lakes and runoff; ice velocity studies.
7. **The Antarctic Ice Sheet:** History; internal structure; key data from ice cores on past atmospheric composition; vulnerability of the West Antarctic Ice Sheet to rising sea level; research on subglacial water systems; Antarctica in the climate system.
8. **Sea ice on Earth:** Nature and distribution; changes in area, thickness and volume; past variations; likely changes during the 21st century; importance of sea ice in Earth´s climate system; ongoing developments in the Arctic (shipping, settlements, research coverage).
9. **Climate, climate variations and earth systems modelling:** Representation of the cryosphere in climate models and Earth systems models; modelling of cryospheric variations and resulting hydrological changes on all time scales from ice ages, through Holocene climate variations to centennial, decadal and annual variations; importance of the cryosphere as a trigger of rapid climate change.
10. **Research gaps, monitoring programs, new technologies:** Emerging methods and technologies in surface-based, airborne and spaceborne studies of snow, ice masses, lake and river ice conditions and permafrost, with special emphasis on the development of derived products for cryospheric and polar scientific research and applications.
11. **Opportunities, adaptation and mitigation:** Importance of understanding and taking current and future cryospheric variations into account for the design and operation of societal infrastructure, such as coastal and hydrological infrastructure and hydropower systems.

If you have questions about the suitability of your paper for this Annals issue, please contact the *Annals* Associate Chief Editor Regine Hock <rehock@alaska.edu>.

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