Geophysical Research Abstracts
Vol. 12, EGU2010-6339, 2010
EGU General Assembly 2010

GLACKMA's strategy of a network of monioring stations for generating a database of hourly time series of glacier discharge

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An understanding of glacier hydrology is central to an understanding of glacier behaviour. Glacier hydrology controls many of the major glacier dynamic and glacial geologic processes. The behaviour of water in glaciers also reveals the structure of the ice and of the glacier at a variety of scales, and indicates how this structure changes through time in response to seasonal and longer term changes in the glacier and its environment.

In the expeditions we have carried out both to temperate and subpolar glaciers in both hemispheres, we have observed the existence of endoglacier and subglacier flows and drainages also in subpolar glaciers. They are not so intense, but they are similar to those existing in temperate glaciers. The specific glacier discharges that we have been measured give values like these:
0,9-1,4 cubic meters per second and for square kilometer of catchment area in temperate glaciers (Lat. 64ºN; Lat. 51ºS),
0,2-0,5 cubic meters per second and for square kilometer of catchment area in subpolar glaciers (Lat. 79ºN; Lat. 62ºS).
For example in Collins glacier in King George Island (Antarctica) we have found that the total drained volume per year (during the last decade) is been between 1,3 and 2,6 cubic hectometers per square kilometer of catchment area. And we also must take into account that the planet surface covered by temperate glaciers is much smaller than that corresponding to subpolar glaciers.

As part of the GLACKMA project that we set in motion in 2001, we have already implemented seven Experimental Pilot Catchment (CPE), four in the northern hemisphere and three more in the southern one (8670 data per year per measured parameter in each station). These CPE's are measuring sub- and endo-glacier drainage for recording of glacier melt water run-off, generating hourly time series of glacier discharge.
In the Southern Hemisphere:
* CPE-ZS-51ºS, in the Chilean Patagonia,
* CPE-KG-62ºS, in Insular Antarctic,
* CPE-VER-65ºS, in Antarctic Peninsula.
In the Northern Hemisphere:
* CPE-KVIA-64ºN, in Iceland,
* CPE-TAR-67ºN, in the North of Sweden,
* CPE-ALB-79ºN, in Svalbard.
* CPE-OBRU-68ºN, in the Siberian Urals.

With the registers obtained from these already implemented stations, we seem to be finding that glacier specific discharge is almost immediate and very sensitive to any variation in environmental temperature. This allows us to establish a net of CPE stations, generating continuous hourly time series of glacier discharge, which would be used as indicators to assess the evolution of Global Warming
We present here the strategy of GLACKMA for the establishment of a glacier monitoring network at different latitudes in both hemispheres that would allow a comparative study of glacier discharge according to climate evolution.