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Glacier discharge and climate variations

M.Carmen Dominguez (1), Concepcion Rodriguez-Puebla (2), Ascension H. Encinas (1), Isabel Visus (1), and Adolfo Eraso (3)

(1) University of Salamanca, Applied Mathematics, Salamanca, Spain (karmenka@usal.es), (2) University of Salamanca, Atmospheric Physics, Salamanca, Spain (concha@usal.es), (3) Polythecnic University, Madrid, Spain (adolfo.eraso@upm.es)

Different studies account for the warming in the polar regions that consequently would affect Glacier Discharge (GD). Since changes in GD may cause large changes in sensible and latent heat fluxes, we ask about the relationships between GD and climate anomalies, which have not been quantified yet. In this study we apply different statistical methods such as correlation, Singular Spectral Analysis and Wavelet to compare the behaviour of GD data in two Experimental Pilot Catchments (CPE), one (CPE-KG-62ºS) in the Antarctica and the other (CPE-KVIA-64ºN) in the Arctic regions. Both CPE's are measuring sub- and endo-glacier drainage for recording of glacier melt water run-off. The CPE-KG-62ºS is providing hourly GD time series since January 2002 in Collins glacier of the Maxwell Bay in King George Island (62ºS, 58ºW). The second one, CPE-KVIA-64ºN, is providing hourly GD time series since September 2003 in the Kviarjökull glacier of the Vatnajökull ice cap in Iceland (64ºN, 16ºW). The soundings for these measurements are pressure sensors installed in the river of the selected catchments for the ice cap (CPE-KG-62ºS) and in the river of the glacier for (CPE-KVIA-64ºN). In each CPE, the calibration function between level and discharge has been adjusted, getting a very high correlation coefficient (0.99 for the first one and 0.95 for the second one), which let us devise a precise discharge law for the glacier. We obtained relationships between GD with atmospheric variables such as radiation, temperature, relative humidity, atmospheric pressure and precipitation. We also found a negative response of GD to El Niño teleconnection index. The results are of great interest due to the GD impact on the climate system and in particular for sea level rise.