

## ***Interactive comment on “Spatial and temporal variations of glacier extent across the Southern Patagonian Icefield since the 1970s” by A. White and L. Copland***

**A. White and L. Copland**

awhit059@uottawa.ca

Received and published: 5 August 2013

The authors would like to express their appreciation for the detailed comments. Below are the responses.

### **RESPONSE TO ANONYMOUS REFEREE #1**

COMMENT: 1.- The poor reference list considering previous research. Most of the work presented in this manuscript has been done by other authors at regional or local levels (Davies and Glasser, 2012; Aniya and Naruse 2012; Rivera et al, 2012a; Raymond et al, 2005 among many others).

C1301

RESPONSE: We thank the reviewer for their suggestions, and have added many new references to the text; note that some of these papers were not yet released when this paper was originally written

COMMENT: 2.- The connection with climate is weak and it is not considering several recent papers describing this issue; like regional trends, the use of NCAR reanalysis data, automatic weather stations, radiosonde data or satellite images (Carrasco et al, 2002 and 2008; Bown and Rivera 2007; Rasmussen et al 2007; Falvey and Garreaud 2009, Garreaud et al, 2013; Aravena and Luckman, 2009; Monahan and Ramage, 2010; De Angelis et al, 2007) among many others. For example regarding precipitation changes, there is a clear contradiction between this manuscript and the recent one by Garreaud et al, 2013.

RESPONSE: These references have been incorporated into the text.

COMMENT: 3.- The weak explanation and consideration of calving as a driving factor. For example, the Tidewater calving cycle described for some of the SPI glaciers is not even considered, as well as other hydrological and bathymetric factors (Rivera et al, 2012 a; 2012b; Sugiyami et al, 2011).

RESPONSE: We have included additional explanation and discussion about the role of calving characteristics and related hydrological and bathymetric factors as drivers for rapid retreat. Studies regarding the Jorge Montt Glacier have also been included to exemplify these local dynamics (Post et al., 2011; Rivera et al., 2012a; Rivera et al., 2012b).

COMMENT: 4.- The volumetric changes are said to be connected to ice thickness. This is true, but these data are very poorly available in Patagonia, therefore most of the volumetric changes are measured using ice elevation changes or gravity changes. This topic is poorly included in this manuscript. Please have a look to Chen et al, 2007, Jacob et al, 2012; Dietrich et al, 2010. Regarding ice thickness, there are few data as I said, but some papers are available (Zamora et al, 2009; Rivera and Casassa, 2002).

C1302

RESPONSE: The background section has been updated to include these references regarding thickness changes over time.

COMMENT: 5.- The used glacier names are not all of them widely accepted, and many are just known by mountaineers. This is explained by the use of touristic sources for naming glaciers. I think it is better to keep the names available in the recent bibliography or databases.

RESPONSE: GLIMS ID numbers have now been incorporated into Tables 2 and 3, and we have also included the lat/long of every glacier to avoid any ambiguity about their location.

---

Interactive comment on The Cryosphere Discuss., 7, 1, 2013.