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The Cryosphere Discussions

Interactive comment on "A new glacier inventory for 2009 reveals spatial and temporal variability in glacier response to atmospheric warming in the Northern Antarctic Peninsula, 1988–2009" *by* B. J. Davies et al.

S. Marinsek

smarinsek@dna.gov.ar

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The study presents an extensive inventory over the Northern Antarctic Peninsula, updating several of the glaciers previously inventoried and including other glaciers. It is valuable that all data was uploaded to the GLIMS database.

Glaciology Division from Instituto Antártico Argentino has been working in field campaigns on Vega Island for more than thirty years. We are carrying out mass balance studies on Glaciar Bahía del Diablo since 1999 and detailed data has been published in

the World Glacier Monitoring Service (WGMS) Glacier Mass Balance Bulletins (GMBB) and Fluctuation of Glaciers (WGMS 2008). We have also carried out mass balance measurements on another glacier, also in Vega Island, in the period 1999-2003. These results remains unpublished.

Specific comments and suggestions:

From WGMS bulletins and from Skvarca et al. (2004) it is clear that GIV09 and Glaciar Bahía del Diablo (GBD) are not the same glacier. GBD is a land-terminating glacier with and area of 14.3 Km^2. GBD data is published in GMBB with WGMS ID, area, location, classification, state and other fluctuation data (WGMS 2008). GIV09 boundary is not correct and include GBD and parts from others neighbor glaciers, a marine-terminating section belonging to GIV10 and a section belonging to GIV26. These two sections account the rest of the GIV09 derived area (4 Km^2 approx.). GBD drainage area and boundary were derived from field surveys over the whole glacier by means of differential GPS. By processing SPIRIT DEM with hydrological tools we also could derive similar glacier basins, confirming that they are different glaciers with different catchments areas.

GIV24 presents a similar issue. From our differential GPS surveys carried our within the mass balance measurements in the period 1999-2003, this glacier is also composed by two separated glaciers. The glacier we have studied had an area of 3.3 Km^2 in 2002, half of the 6.6 Km^2 of the GIV24 in 2001.

P3555: GBD is not experiencing frontal retreat (WGMS 2009, 2011). Mentioned GIV09 retreat corresponds to the neighbor glacier marine-terminated GIV10. Equilibrium line altitude (ELA) found by Skvarca et al. (2004) and others ELAs published in GMBB are from GBD and not from GIV09. GMBB No. 11 includes the graph ELA versus specific mass balance for a 10 year observation period, confirming the ELA_{MEAN} is higher than the remotely mapped.

P3558: The amount of land-terminating glaciers on Vega Island should be updated, as

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there are more than seven.

P3559: GBD must be removed from the section 5.3 as it is not a marine-terminating glacier and moved to section 5.2. The mentioned continued shrinkage of GIV09 is because of the GIV10 marine-terminating terminus retreat, which is not part of GBD. GBD is in stable state and has not sown area change since the mass balance measurements started.

P3562: Rates of retreat mentioned of 22.3 Km^2 a^{-1} in the period 1988-2001 and 15.1 Km^2 a^{-1} in the period 2001-2009 can not be compared with results from Skvarca et al. (1995) and Rau et al. (2004) because the studied glaciers to measure the changes are different. Our results for the mentioned period indicate retreats of 2.9 Km^2 a^{-1} in the period 1988-2001 and 2.6 Km^2 a^{-1} in the period 2001-2009, which were measured over the same 39 glaciers studied in the period 1975-1988 by Skvarca et al.(1995). However these results also confirm an increased rate of recession in both periods compared with the observed retreat of 1.8 Km^2 a^{-1} in the first period.

Because of the issues mentioned in drainage areas delineation, ice divides should be improved on Vega Island in order to avoid mix of basins of different glaciers in only one. Also tables and figures should be updated.

There are two SPIRIT DEMs covering Vega and James Ross islands. Versions used in each processing also should be mentioned and if correlations coefficients or other information were used to mask the unreliable data.

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