



The Reconstruction and Climatic Implication of an Independent Palaeo Ice Cap in the Vicinity of the Lago Buenos Aires/Lago Pueyrredón Palaeo Ice Streams, Patagonia.

I. W. Wolff and N. F. Glasser

Institute of Geography and Earth Sciences, Aberystwyth University, Aberystwyth, Wales, UK, (iww09@aber.ac.uk)

The increasing availability of freely accessible high resolution imagery leads to the discovery of more and more previously undetected glacial landforms within the most remote areas. This oral presentation will give an example of a not yet described palaeo ice cap near Meseta Cuadrada (47° 4' S/71° 38' W) on the Meseta del Lago Buenos Aires, Patagonia.

The existence of the “Meseta Cuadrada Palaeo Ice Cap” (MCPIC), located around 140 km east of the North Patagonian Icefield, offers the possibility to study a former glacier system independent from the well documented Lago Buenos Aires and Lago Pueyrredón Palaeo Ice Streams. Due to its separated position from the Last Glacial Maximum Patagonian Ice Sheet this palaeo ice cap can be used to deliver reasonable accumulation estimates from within the rain shadow of the Patagonian Andes. This is particularly of high interest for climate reconstructions and future modelling attempts. The age of the MCPIC is not clear due to lacking age control in the field. The distance from the well preserved outer moraine belt to the still existing glaciers within the area of the palaeo ice cap suggests timing similar to the Last Glacial Maximum (LGM).

Based on detailed geomorphologic mapping and the application of glacier surface profiles it was possible to reconstruct the area and volume of the Meseta Cuadrada Palaeo Ice Cap. The ice cap covered an area of around 78 km² and had an ice volume of circa 9.2 km³. The widely used accumulation - ablation - area ratio of 0.66 delivered an equilibrium line altitude (ELA) of 2031 m a.s.l. . For comparison the ELA of the still existing Meseta Cuadrada Glacier was calculated with the same method and lies with 2317 m a.s.l. only 286 m higher than the ELA of the last local maximum extent.

The application of a Degree Day Modelling Approach shed light into LGM and current accumulation values necessary to nourish the MCPIC and Meseta Cuadrada Glacier and thus into past and present precipitation regimes within an Area with virtually no precipitation data available. Accumulation at the Meseta Cuadrada Palaeo Ice Cap was only between 391- 932 mm/a water equivalent depending on the lapse rate (0.007 °C/m or 0.006 °C/m). The accumulation necessary to feed Meseta Cuadrada Glacier is around 3696 mm/a water equivalent which is considerably more than during the maximum extent of MCPIC. The reason for this is believed to lie in the pronounced precipitation shadow effect during full Glacial conditions where the Patagonian Ice Sheet trapped more precipitation off the Southern Westerlies.

Apart from the mapping, reconstruction and palaeo climatic implications of the newly discovered “Meseta Cuadrada Palaeo Ice Cap” future research perspectives will be given followed by a brief discussion of short comings and uncertainties