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Ice core study in Patagonia (San Valentin, 47°S) over the last century

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We present the results of the first long ice core record at mid-southern latitudes obtained in the Chilean Patagonia. In April 2005, a 16m-long shallow firn core (40 years record) was drilled at the San Valentin summit, Northern Patagonia Icefield, Chile (4032m, 46°35'S, 73°19'W) in the Northern Patagonia Icefield (NPI) and in May 2007, several ice cores including a 122m-long deep ice core (present study) were extracted close to the 2005 site. The firn temperature, measured during the first drilling campaign, was -11.9°C at 10m depth. We observe a well preserved glaciochemical record in the cold ice.

We present the isotopic composition (deuterium and oxygen 18) of the ice from the surface down to 70 meters. The aim of the present study is to identify and validate a modern link between the isotopic composition of the ice (deuterium and oxygen 18) and the environmental conditions (temperature and/or precipitation and/or air masses trajectories) prevailing over Patagonia. In future works, this relationship will be used to interpret the deep ice core record. We used the data from meteorological stations and re-analyses to understand the seasonal isotopic variations. The preliminary interpretations are supported by the chemical signals observed in the ice. The dating of this ice core is based on reference layers (nuclear weapon tests) and on counting of isotopic cycles. We calculate that the first 70 meters may span the last 100 to 150 years.