2014 over-snow traverse to the ice divide between Pine Island, Rutford and Institute Ice Stream, WAIS

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On January 2014 we completed a new scientific exploration to WAIS. During this campaign we took advantage of the logistic facilities in the region, especially at Union glacier (79º46'S/83º24'W), where the private company Antarctic Logistics and Expeditions (ALE), annually operates for their commercial operations. From this base camp, we conducted a 1200 km long radar and GPS survey to the triple ice divide between Institute Ice Stream, Rutford Ice Stream and Pine island glacier. This was done on the ground by using a brand new mobile scientific research module (caboose) that was pulled by an ALE tractor. During this survey, we also carried out mass balance measurements, snow samples collection (short ice/snow cores) and meteorological observations.

The radar systems that we used are a low-gain high-frequency (203-1019 MHz) and a high-gain low-frequency (155 MHz, 20 MHz bandwidth) antenna. This feature allowed us to detect ice-bed interface as well as snow-firn stratigrahy. A minimum of 518 m and a maximum of 3100 m of ice thickness were detected, using a mean ice density of 0.168 m/ns. The Bed Reflection Power (BRP) was also calculated by analyzing the radar along profiles. The GPS surveys allowed radar data positioning as well as surface height estimation (accuracy of +-10cm). Also, an automatic weather station (AWS) was mounted on the module to collect meteorological data (temperature, humidity, pressure and sun radiation). The main feature of the AWS is the real time data transmission to a server via iridium.

The comparison between CECs and BEDMAP2 data has revealed a difference up to 1700 m in ice thickness, especially in areas, where the bed topography is steep and where BEDMAP2 coverage is poor.

After these findings, we think that more radar ice thickness surveys are necessary to enhance model and simulation results associated with ice dynamics.

On December 2014 we will carry out a new campaign to survey in more detail the study area.

The Times They are a-Changin'