

NERC GEOPHYSICAL EQUIPMENT FACILITY PROJECT 903 SCIENTIFIC REPORT

Benjamin Brock (PI), Martin Kirkbride (CI), Mark Cutler (CI)

School of Social and Environmental Sciences, University of Dundee, Dundee. DD1 4HN

Tel. 01382 385443, e-mail b.w.brock@dundee.ac.uk

Airborne Survey of Debris-covered Glaciers in the Western Italian Alps Equipment and loan period: Leica System 1200 GPS, 13/8/09 – 3/9/09

Abstract

A Leica System 1200 GPS was loaned to provide a base station record in support of two NERC ARSF approved projects (GB07/09 and GB07/10). The base station was occupied using the Leica 1200 on most days between 23 and 30 August 2009 while the ARSF crew were in Italy, but due to a combination of highly changeable weather conditions and technical problems with the airborne survey equipment most sorties had to be abandoned and only partial data have so far been received by the PI. The Leica 1200 worked successfully on all occasions it was deployed, and provided a satisfactory reference datum for the airborne data, but the data themselves are not considered worthy of further analysis or publication.

Background and Survey Procedure

A Leica System 1200 GPS was loaned to provide a base station record in support of two NERC ARSF approved projects (GB07/09 and GB07/10) held by the PI and CIs, providing airborne survey of debris-covered glaciers in the Italian Alps on the south side of the Mt Blanc Massif (45°47'N, 06°52'E). The ARSF projects had been 'rolled over' to 2009 due to a combination of poor weather and technical problems in previous years. The base station (Figures 1,2 and 3) was occupied on most days between 23 and 30 August 2009 while the ARSF crew were in Italy, but due to a combination of highly changeable weather conditions and technical problems with the airborne survey equipment most sorties had to be abandoned and only partial data (Eagle and Hawk data for part of the target site on 27/08/09) have so far been received by the PI.

Fig. 1. National



Fig. 2. Regional



The boxed area shows the study site location

Data Quality, Processing, Results and Interpretation

The Leica 1200 worked successfully on all occasions it was deployed, and the base station file was supplied to the ARSF Data Analysis Node, providing a satisfactory reference for the airborne data. The ARSF crew did reach the site on 27/08/09 but rapid cloud build up obscured the target site and the sortie was abandoned after only some of the flight lines had been flown (Figure 4). Consequently, the Eagle and Hawk data are not considered worthy of further analysis or publication. It had been hoped to use the Leica system in differential mode to obtain velocity

Conclusions and Recommendations

While the 2009 campaign was largely unsuccessful due to factors outside of the investigators' control, complete airborne data collection for both ARSF projects and a very successful surface velocity survey of Miage glacier, using differential GPS, supported by a separate GEF loan (#917), were achieved in June-July 2010. These results will be covered by a separate report. Due to the sometimes challenging conditions in high alpine environments it may be necessary to repeat field campaigns on more than one occasion in order to obtain sufficiently high quality data for analysis and interpretation.

Publications

No publications arising directly out of the 2009 dGPS and airborne remote sensing are planned, although some of the airborne data may provide supplementary information for papers expected to arise from analysis of the 2010 data.

Appendix

ARSF projects supported by GEF Loan 903

1. ARSF Award No GB07/09: Quantification of supraglacial sediment flux using airborne LiDAR and ATM at alpine glaciers (Rating A4)

PI: M. Kirkbride, CIs: M. Cutler and B. Brock

2. ARSF Award No GB07/10: Remote sensing of thermal properties and climate change response of debris-covered glaciers (Rating A4)

PI: B. Brock, CIs: M. Cutler and M. Kirkbride