Exposure history of pre-LGM glacial drifts in Terra Nova Bay: field work and first results from the XX and XXI Italian Antarctic expeditions

Di Nicola, L., aBaroni, C., bSalvatore, M.C., cStrasky, S., cWieler, R., dAkçar, N., dGraf, A., eIvy-Ochs, S., fKubik, P.W. & dSchlüchter, C.

Università di Siena, Scuola di Dottorato in Scienze Polari, Via del Laterino 8, 53100 Siena; Italy, luigiadinicola@alice.it
aUniversità di Pisa, Dipartimento di Scienze della Terra, Via S. Maria, 53, 56126 Pisa, Italy, baroni@dst.unipi.it
bUniversità degli Studi di Roma La Sapienza, Dipartimento di Scienze della Terra, P.le A. Moro 5, 00185 Roma, mariacristina.salvatore@uniroma1.it
cETH Zürich, Inst. f. Isotopengeologie und Mineralische Rohstoffe, Clausiusstrasse 25 CH-8092 Zürich, strasky@erdw.ethz.ch, wieler@erdw.ethz.ch
dUniversity of Bern, Institute of Geological Sciences, Baltzerstrasse 1-3, 3012 Bern, Switzerland, akcar@geo.unibe.ch, angela.graf@geo.unibe.ch, schluech@geo.unibe.ch
eInstitute of Particle Physics, ETH Hönggerberg, 8093 Zürich, Switzerland, ivy@phys.ethz.ch
fPaul Scherrer Institute c/o Institute of Particle Physics, ETH Hönggerberg, 8093 Zürich, Switzerland, kubik@phys.ethz.ch

The history of the East Antarctic Ice Sheet is one of the key issues in paleoclimate research. The expansion of the ice sheet at its margin is directly related to variation in ice thickness, and this expansion is recorded by glacial deposits and glacial erosional features. When these geomorphological features are dated, the chronology of the ice volume variation can be reconstructed.

This study focuses on Terra Nova Bay region (in northern Victoria Land) where a complex and unique glacial system is developed between Priestley Glacier (South), Rennik Glacier (West) and Ross Sea (East and North). This glacial system is completely independent from the East Antarctic Ice Sheet (Baroni et al. 2005) and it is not fed by the East Antarctic Ice Sheet but by local glaciers. Dating of erratic boulders and glacially eroded surfaces using terrestrial cosmogenic nuclides ($^{10}$Be, $^{21}$Ne and $^{26}$Al), will enable the study of the investigated glacial system dynamics, the establishment of its glacial history and chronology, and the correlation of glacial advances with those in the Transantarctic Mountains.

In the first phase of this study, 17 samples from erratic boulder from Terra Nova Bay region were processed for surface exposure dating. Accelerator mass spectrometry measurements of $^{10}$Be/$^{9}$Be and $^{26}$Al/$^{27}$Al were performed at the ETH/PSI tandem facility in Zurich. $^{10}$Be measurements of the samples were successfully completed, and $^{26}$Al measurements are still to be completed. The $^{21}$Ne/$^{20}$Ne and the $^{22}$Ne/$^{20}$Ne were measured with a 90° sector field static noble gas mass spectrometer at ETH Zurich. According to the results from the first phase, the sampling strategy of the second phase is developed. Following this strategy, 42 samples from Terra Nova Bay region were collected and 20 of these samples are still to be prepared for $^{10}$Be, $^{21}$Ne and $^{26}$Al.
measurements. A detailed interpretation with a multiple nuclide approach will be done after gathering the results from the mass spectrometer measurements.

REFERENCES