METHODS AND TECHNIQUES USED FOR CALCULATING GLACIER 3D MODEL (DTM) AND FOR THE EVALUATION OF GLACIER WATER RESOURCE. APPLICATIONS AND FIRST RESULT ON "PUNTA PENIA DOME (MARMOLADA GLACIER) " (TN-ITALY).

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By this contribution the authors show the main results obtained in summer 2004 surveying some glaciers of the East Dolomites; the field campaigns have been performed using jointed GPS and georadar (GPR) instruments. The authors show their experience in coupling these two surveys and in georeferencing the radar measured sections. The data so obtained have been used to calculate 3D models (DTM) of glacier surface and bedrock. Afterwards are described the operating procedures used and the results obtained on Marmolada Glacier (Punta Penia dome), showing furthermore, the latest methods and techniques for calculating glacier mass balance, through *GPR, GPS and laser-scanning data.* For better modelling and reconstruction of glacier surface, it has been employed a survey technique called "criss- cross" through which have been collected the glacier cross- sections (along contour lines) and the glacier terminus measurement. Definitely have been collected about 3000 points by GPS (with a high accuracy) with a grid of 1-2 meters. Using moreover a laser-scanning survey (performed the first time in the summer 2003 that is so our reference year by CGR of Parma and the Province of TN) and the georadar survey, it was possible to do more accurate calculations of glacier changes in volume (both in the accumulation and in the ablation zone) and the respective mass balances. The final aim of the job was to calculate the whole glacier volume and the equivalent water resource.