



Comparison among GPR measurements and ultrasonic tomographies with different inversion strategies applied to the basement of an ancient egyptian sculpture.

Luigi Sambuelli (1), Gualtiero Bohm (2), Patrizia Capizzi (3), Ettore Cardarelli (4), Pietro Cosentino (3), Laurent D'Onofrio (5), and Mario Marchisio (5)

(1) DITAG, POLITECNICO, TORINO, ITALY (luigi.sambuelli@polito.it), (2) OGS, TRIESTE, ITALY (gbohm@ogs.trieste.it), (3) CFTA, UNIVERSITY, PALERMO, ITALY (pietro.cosentino@unipa.it), (4) DITS, UNIVERSITY, ROMA, ITALY (ettore.cardarelli@uniroma1.it), (5) DIPARTIMENTO DI INGEGNERIA CIVILE, UNIVERSITY, PISA, ITALY (m.marchisio@ing.unipi.it)

By the late 2008 one of the most important pieces of the “Museo delle Antichità Egizie” in Turin, the sculpture of the Pharaoh with god Amun, was planned to be one of the masterpieces of a travelling exhibition in Japan. The “Fondazione Museo delle Antichità Egizie di Torino”, managing the museum, was concerned with the integrity of the basement of the statue which actually presents visible signs of restorations dating back to the early IXX century.

The questions put by the museum managers were to estimate the internal extension of some visible fractures, to search for unknown internal ones and to provide information about the overall mechanical strength of the basement. In order to tackle the first and second questions a GPR reflection survey of the basement along three sides was performed and the results were assembled in a 3D rendering. As far as the third question is concerned, two parallel, horizontal ultrasonic 2D tomographies across the basement were made with a source-receiver layout able to acquire, for each section, 723 ultrasonic signals correspondent to different transmitter and receiver positions. The ultrasonic tomographic data were inverted using different software based upon different algorithms. The obtained velocity images were then compared with the GPR results and with the visible joints on the basement. A critical analysis of the comparisons is finally presented.