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**DEFORMATION STUDIES OF THE DAM OF MORNOS ARTIFICIAL LAKE VIA ANALYSIS OF GEODETIC DATA**

V. GIKAS, D. PARADISSIS, K. RAPTAKIS and O. ANTONATOU

National Technical University of Athens

Athens Water Supply & Sewerage Company

**The artificial lake of Mornos - Greece**

- the main storage reservoir for Athens
- located in Central Greece (~ 220 km W-NW of Athens)
- maximum capacity  $780 \times 10^6 \text{ m}^3$

chronological details

- construction period: 1973-1979
- filling stage : 1979 – 1982
- operation period: 1982 - today

**Technical characteristics of Mornos dam**

- earthen fill dam
- total height: 126 m
- crest length: 825 m
- crest width: 10 m
- network of inspection galleries

complicated tectonic structure

- left abutment: solid sand stone
- right abutment: weak tectonite & flysh structures

**Geodetic monitoring of Mornos artificial lake and the dam**

Images showing monitoring points on the dam crest and surrounding terrain.

**GPS campaigns 2002 - 2004**

- four surveys: NOV'02 → APR'03 → OCT'03 → APR'04
- 17 monitoring stations: 8 upstream and 9 downstream
- 1 base station, 1 intermediary station
- 5 GPS L1/L2 receivers, 15 sec,  $15^\circ$  mask angle

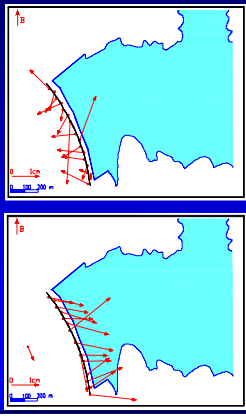
Map showing the location of the dam and monitoring stations. Distance to the dam is approximately 6 km.

**Precise leveling observations 2002-2004**

- 17 points along the crest
- benchmark on stable ground
- 24 points within the dam body // double run leveling:  $>1\text{km} / \pm 1\text{mm}$

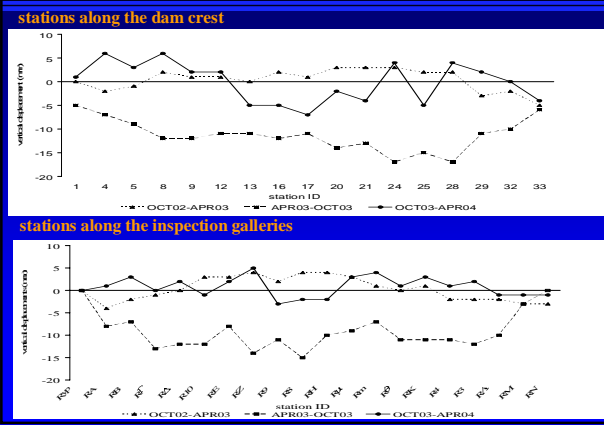
Diagram showing the layout of leveling points along the dam crest and within the dam body.

**Horizontal deflections – GPS data evaluation (2002 – 2004)**

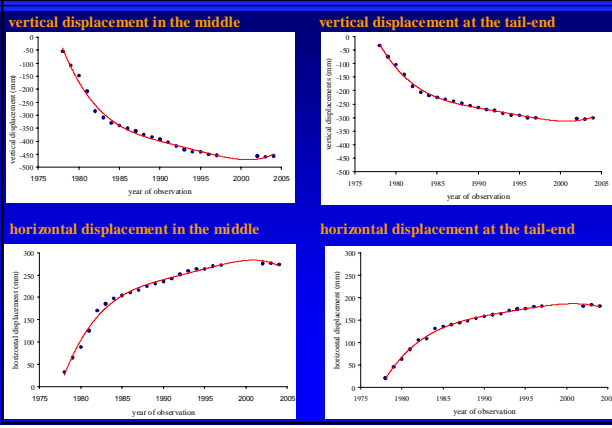


- statistically significant displacements
- overly consistent in directional distribution
- no obvious reaction in response to water volume variation

**Vertical displacements – precise leveling data evaluation (2002 – 2004)**



**Horizontal and vertical deflection of selected points – 30 years obs.**



**Vertical displacements along the dam crest – 30 years obs.**

