

## **GEOPHYSICS FOR THE PRESERVATION OF ARCHITECTURAL MONUMENTS**

SLEPAK, Z.M. Geological Faculty, Kazan State University, Kazan, Russia.

Complex geophysical monitoring in the urban territories with architectural monuments is a new branch of geophysics applied-in such a mode for the first time-to problems of engineering geology and hydrogeology. Geophysical observations permit to study damaging impact of active geological and technogenic processes on basements of the buildings in order to take timely prophylactic measures.

Hydrological conditions of the Kremlin Hill have been studied through repeated gravimetric and electromagnetic measurements (on the same grid) in the area of Kazan Kremlin, Kazan, Russia, to reveal how ground- and technogenic waters influence architectural monuments of the 16-19 centuries AD,- the Suyumbeki Tower, Tainitskaya Tower, Governor's Palace, and fortress walls.

Seasonal groundwater-level changes have been found to have caused the inclination of the Suyumbeki Tower (which is actually a falling tower), wrecking condition of the Governor's Palace and the destruction of its annex. Gravimetric measurements of the 1st and 2nd vertical derivatives of gravity potential, conducted within the buildings, revealed subsurface rock volumes of decreased density and active groundwater dynamics. These rock volumes are observed on the vertical sections of total electric conductivity.