



Sub-pluvial Saqqara and its possible impact on ancient Egyptian civilization in the Old Kingdom Period (4600 – 4100 yrs BP)

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Geological and geoarchaeological investigations were carried out at several archaeological sites in northern Egypt within the Memphis Necropolis (Saqqara, Abusir, and Giza). Sedimentological analysis of exposures in western Saqqara, excavated by the Polish-Egyptian archaeological team led by Professor Karol Myśliwiec (Institute of Mediterranean and Oriental Cultures, Polish Academy of Sciences), supplied with significant paleoclimatic data and enabled reconstruction of regional climate change during the Old Kingdom Period (4600 – 4100 yrs BP). Potential influence of this climate change on development of the early Egyptian civilization in this area was determined.

Examined exposures indicated that during the Old Kingdom Period the area of Saqqara (at present located in a desert) has been many a time flooded with sheet floods, water of which was heavily charged with debris moving down-slope. Performed geochemical and sedimentological analyses proved that climate in the Old Kingdom time was warm and relatively wet. In 4200 – 4100 yrs BP a quick climate change from wet to extremely dry occurred, with occasional stormy winds. These unfavorable climatic conditions were accompanied by catastrophically low seasonal floods of the Nile, resulting in famine and drought recorded in archaeological data and consequently, leading to a disintegration of the Egyptian state.

The authors' investigations indicated that a climate change in Egypt in the second half of the 3rd millennium BC is however not as univocal as considered previously. Well-known gradual aridification of the north-eastern Africa, initiated about 5000 yrs BP, has not been unidirectional and was varied regionally. The collected data indicate univocally that there were quasi-cyclic climatic fluctuations. In spite of a distinct trend, the dry period has been interrupted by numerous short wet episodes, occurring during the interval 4600 – 4200 yrs BP and especially at the end of the Old Kingdom Period (ca. 4200 yrs BP).

A role of these wet intervals is incontestable and they can represent a sub-pluvial episode with two peaks at about 4600 and 4200 yrs BP, presumably of regional significance for north-eastern Africa. The authors suggest to name this relatively wet period the Saqqara Sub-pluvial.

Based on the present knowledge, the extremely dynamic terminal phase of the second peak of the Saqqara Sub-pluvial and the following sudden desertification noted in deposits at archaeological sites in Saqqara and in the adjoining area (Abusir, Giza) should be roughly correlated with global climatic perturbation of the 3rd Bond Event or 4.2 ka Rapid Climate Change. The climate change in that time resulted in a collapse of the Egyptian civilization but also in rapid depopulation of Palestine, disintegration of the Acadian Empire in Mesopotamia and the Harappa Civilization in northwest India. Mechanism of this climate change is investigated within the project funded by National Science Centre in Poland (decision no. DEC-2012/05/B/ST10/00558).