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Applying INAA to raising a chemo-stratigraphy of a complex volcanic eruption sequence on Nisyros and Tilos, Greece

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About 66000 years ago a series of eruptions on the eastern flank of Nisyros volcano in the Aegean Sea built up several new layers of eruption products over the course of approximately 40000 years. Some of those eruption products from the so-called Kyra-series were deposited on the nearby non-volcanic island of Tilos.

The interdisciplinary research-project SCIEM2000, consisting of a cooperation of researchers in the humanities and the natural sciences tries to synchronize the different chronologies of the civilizations of the Eastern Mediterranean in the 2nd millennium BC. Using a database of "chemical fingerprints" of pumice from medium- to large-scale volcanic eruptions in the corresponding area, archaeological finds of pumices can be identified and different stratigraphies can be synchronized. Thus, a constant aim of the research-project is the extension of the existing data-base with hitherto unsampled pumice-producing volcanic sources.

The Kyra-series consists of eight different eruptions, containing several phases each. Due to its distribution on the non-volcanic island Tilos, contaminations with other volcanic sources can easily be resolved. Thus, the sequence offers unique possibilities to investigate a complex series of eruptions by creating a detailed chemical and stratigraphical sequence. By the application of Neutron Activation Analysis to the thorough chemical investigation of the eruption products and due to the clear stratigraphical relationship between the different units, a detailed chemo-stratigraphy of the complete eruption sequence was produced. Furthermore, the deposits on Nisyros and Tilos were clearly related to each other.

Keywords – INAA, Kyra-series, volcanic eruption products