The potential of Late Quaternary tephrostratigraphy and cryptotephrostratigraphy of the Eastern Adriatic coast

Potencijal kvartarne tefrostratigrafije i kriptotefrostratigrafije istočno jadranske obale

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Tephra layers are significant in palaeoenvironmental research on the Eastern Adriatic coast and they can be linked to specific eruption events in proximal volcanic settings. These distal tephra records are sometimes extremely thin and barely visible or are not visible at all (“cryptotephra” layers), but they can be traced over greater distances from volcanic source, and can be preserved in various natural archives (lake and marine sediments and soil sequences). The sediment cores recovered from the lake, marine and terrestrial environments along the Eastern Adriatic coast allowed identification of tephra and cryptotephra layers. Magnetic susceptibility, geochemical analysis and heavy and light mineral fraction are used to trace the tephra layers (Fig. 1).

In Novigrad area (Central Croatia), there is terrestrial tephra, differs from the surrounded sediments, it is orange in color, with higher values of Ba, Zr, Hf and Zn at 110 cm in the soil profile. In the lake/marine sediment core from Pirovac Bay (water depth 25 m), Central Croatia, two cryptotephra layers have been documented. Sediment layer at 642 cm show higher magnetic susceptibility and it could be attributed to the Phlegraean field eruption - the Agnano Pompei Principali (APP 12400-12000 cal yrs BP; CALANCHI & DINELLI, 2008). It also appears in Lake Shkodra on Montenegro/Albanian border (SULPIZIO et al., 2009). This tephra has been reported as being a good marker for the Younger Dryas. At 721 cm the sediment is characterized by the higher magnetic susceptibility, and it shows the age of around 13,800 cal yrs BP. It could possibly belong to Napolitan Yellow Tuff (13600-14700 cal yrs BP; CALANCHI & DINELLI, 2008). In the Baćina Lakes in the Southern Croatia several cryptotephra layers were found. The tephra was identified on 457 cm and 505-507 cm in Lake Crniševo, by the very high magnetic susceptibility and higher values of K, Na, Mg, Zr in the overall sediment chemical composition. It

![Figure 1. Magnetic susceptibility of the all cores where the tephra layers were found. Slika 1. Magnetski susceptibilitet svih jezgr i kojima je pronađena tefra.](image-url)
is assumed that tephra belongs to Agnano Astroni Monte Spino (AMST), the eruption of the Phlegraean fields (around 4400 cal yrs BP). In Lake Podgora, on 587 cm of the core, there is the high magnetic susceptibility and glass shards were identified. This cryptotephra could belong to Campanian Provenance, Agnano Pomici Principali (APP) eruption. In Lake Sladinac, on 261 cm of the core, tephra was identified by strong magnetic susceptibility peak and it could be record of Avellino eruption of Somma-Vesuvius on the Eastern Adriatic coast (Fig. 2). All these tephras have been documented in Lake Shkodra (SULPIZIO et al., 2009), Adriatic Sea cores (CALANCHI & DINELLI, 2008) and Lago Grande di Monticchio (WULF et al., 2004). New tephrochronology is established in the lakes Veliko and Malo Jezero on the Island of Mljet, where 2 tephra layers have been reported previously, and they were linked to Campanian provenance and Mercato eruption (7300 yrs BP; JAHNS & VAN DER BOGAARD, 1998). In recent research, two tephra and two cryptotephras were evidenced, which still have to be analyzed in detail. In the Southern Croatia, in the soil profile on the shores of Kaštel Bay, there is another tephra discovered (in Divulje area). It appears on the bottom of the profile, yellow colored, in fragments, not as layers. It contains a lot of volcanic shards, so as volcanic pyroxene (augite) and biotite, apatite and feldspars, especially sanidine. It is probably the oldest tephra analyzed, going back to 39000 yrs – Campanian Ignimbrite, which erupted around 39300 cal yrs BP (GIACCIO et al., 2008). These identified tephra layers are the first evidence of Late Pleistocene and Holocene tephras deposited in lakes and shallow seas on the Eastern Adriatic coast and show potential stratigraphic marker with regional palaeoenvironmental events.

References:


