**METHODS**

For a homogenous sedimentary material, several samples were collected from the same GPS localized point from different years and mixed for subsequent analysis by laser ablation–inductively coupled plasma mass spectroscopy (LIP-ICP-MS) to obtain Pb ages. Sample mounts were loaded into a large-density liquid - SPT (~2.8g/cm

Heavy density liquid - SPT (~2.8g/cm²) and magnetic susceptibility separations for all samples. The conducted U-Pb analysis on detrital zircons from major Romanian rivers and the Danube's tributaries in distinctive units: a) the Danubian units (250–310 Ma) have late Variscan signatures and are lithologically defined by postcollisional granitoids (Balintoni et al., 2010; Balintoni and Balica, 2016), b) the Nord Dobrogea units are considered post-Variscan intrusions aged 245-255 Ma (Krézsek et al., 2016).

The conducted U-Pb analysis on detrital zircons from major Romanian rivers and the Danube's modern sediments show a mixture of different ages, most important peaks observed at ~300-350 Ma, probably related to the Southern Carpathian Late Cretaceous arc and to the Neogene volcanism of the Eastern Carpathians and Apusen Mountains. The obtained ages on the DZ geochronology show downstream mixing, similarly to recent published data focused on the sediment provenance studies (Balintoni et al., 2014; Ducea et al., 2018).

For the Lower Danube western investigated samples, such as Cerna, Topolniţa and Jiu, our results show as main source the metamorphic rocks characteristic for the Upper and Lower Danubian terranes. On the contrary, the Danube Delta front samples show a mixture of different ages, most probably related to the Southern Carpathian Late Cretaceous arc and to the Neogene volcanism of the Eastern Carpathians and Apusen Mountains. The obtained ages on the DZ geochronology show downstream mixing, similarly to recent published data focused on the sediment provenance studies (Balintoni et al., 2014; Ducea et al., 2018).

For the study of sediment provenance, the samples were collected from Mm (maritime mile) 54 on Danube, South and South East of Romania and one sample of major left Danube River tributaries (Cerna, Topolniţa, Jiu, Olt, Arges, Ialomiţa and Siret). Additionally, one sample was collected from the Danube Delta front.

**RESULTS AND DISCUSSIONS**

The studied samples exhibit several main peaks, which are from oldest to newest: i) Cambro-Ordovician, linked to the backarc basins and island arcs of Peri–Gondwana subduction (600–440 Ma); ii) Lower to Middle Carboniferous from Variscan magmatic and metamorphic rocks (550–320 Ma), showing significant values in most analysed samples; iii) Alpine, younger than 100 Ma, most probably related to the Southern Carpathian Late Cretaceous arc and to the Neogene volcanism of the Eastern Carpathians and Apusen Mountains.

The obtained ages on the D2 geochronology show downstream mixing, similarly to recent published data focused on the sediment provenance studies (Balintoni et al., 2014; Ducea et al., 2018).

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**CONCLUSIONS**

The results suggest that the sediments of the western studied tributaries, characterized by small drainage basins, are mainly composed by igneous and metamorphic rocks. The eastern tributaries with larger drainage basins and therefore a much varied type of rocks show a more complex DZ distribution; probably, only a small amount of DZ grains indicates the "primary" source rock. The eastern tributaries, with larger drainage basins and therefore a much varied type of rocks show a more complex DZ distribution; probably, only a small amount of DZ grains indicates the "primary" source rock.

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