# Magmatic and crustal evolution in Georgian Caucasus: evidence from detrital zircons

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Georgian Caucasus, covering parts of the area of Greater, Trans- and Lesser Caucasus, is situated in the most northern Caucasus-Iran-Anatolia (CIA) region. This region has been conventionally regarded as a consequence by the collision of Arabia and Eurasia. Here we report new U-Pb age and Hf isotopic results of detrital zircons for the sedimentary rocks from Jurassic to Miocene formations in Georgian Caucasus to better understand the magmatic record and crustal evolution. Our age data show several significant magmatic activities in the Phanerozoic, including (1) a major one from ~500 to 420 Ma, (2) a major one at ~320 Ma, (3) minor ones at ~220 and 170 Ma, (4) a major one from ~110 to 90 Ma and (5) a major one at ~45 Ma. The Hf isotopes exhibit large variation of the compositions in two former episodes of ~500 to 420 Ma and ~320 Ma, and mainly positive-dominant values since ~220 Ma. This scenario could be correlated with that of magmatic zircons from the igneous rocks in central and south Georgian Caucasus. They display abundant inherited zircons with ages from ~700 to 480 Ma and multi-stage magmatism at ~320, ~220, ~90 and ~45 Ma, showing the similar performance of Hf compositions as those of detrital zircons. These data strongly suggest that the involvement of the juvenile Arabian-Nubian Shield crust from the Cambrian to Silurian, and the existence of a juvenile crust all over Georgian Caucasus since the Carboniferous, representing the extensively growth of the continental crust during the Phanerozoic. Thus we propose two stages of crustal evolution around Georgian Caucasus occurred from Proterozoic to ~500 Ma and from ~500 to ~320 Ma, along with two clear episodes of young crustal growth at ~500 Ma and after ~320 Ma. The results in this study, furthermore, could be applicable to the distinctly magmatic events related to the Gondwana separation, closure of the Paleo- and Neo-Tethys and the Arabia-Eurasia continental collision well identified in many previous studies of the Tethyan orogenic belt.