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Reconstructing Holocene paleoenvironmental conditions in the semi-humid to semi-arid lowlands of the southeastern Caucasus region using ancient terrestrial land snails

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Unlike the western humid lowlands of the southern Caucasus region (Kolkheti Lowland), the Holocene paleoenvironmental evolution of the semi-humid to semi-arid lowlands in the southeastern part (Kura Lowland) has been minimally investigated. Because geographically close areas with different hydrological regimes may not follow equivalent paleoenvironmental histories, local profiles from each locale are necessary to accurately evaluate the paleoenvironmental evolution between contrasting settings. This study reconstructs the paleoenvironmental conditions of the Kura Lowlands using oxygen and carbon stable isotopes of ancient terrestrial land snails recovered from several Holocene fluvial sediment sequences of eastern Georgia. Snail shell samples were recovered from two main areas. The first area represents several profiles encompassing the period between ~9.5 and 0.35 cal. ka BP in the semi-arid surroundings of Tbilisi that are outcropped along Kura and Shulaveris Ghele River (MAP = 450 – 560 mm/yr). The second area depicts sediments from one profile encompassing the period between ca. 8.0 and 1.6 cal. ka BP that is outcropped along the upper Alazani River in the semi-humid foothills of the Greater Caucasus (MAP = 720 mm/yr).
The results from the semi-humid foothills of the Greater Caucasus suggest that humidity appears to have remained similar throughout the Holocene. In contrast, snails from the semi-arid Tbilisi region indicate that conditions were somewhat wetter during the first part of the Holocene (9.5 – 7 cal. ka BP), became gradually drier during the late Holocene and are the driest at present-day. This study illustrates that geographically close regions with differing hydrological regimes seem to be impacted by climate change in a different manner, and reinforces the need for developing local proxies rather than relying on regional-scale proxy data.