Urban socio-economic factors affect the isotopic composition of fish muscle

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The global phenomenon of burgeoning coastal population growth and urbanization has led to coastal ecosystem deterioration, prompting policy-makers to set limits on freshwater withdrawals and labile nutrient loads. Contrasting land use and nutrient sources in Florida watersheds provide many opportunities to isotopically trace the effects of urbanization and local hydrology on biogeochemical nitrogen pathways. Using data collected during rainy Florida summers, mechanistic and empirical linear regression models can accurately predict the stable nitrogen isotopic composition ($\delta^{15}N$) of estuarine fish muscle based on the amount of agricultural and natural land cover in the estuarine watershed. In contrast, similar efforts during the spring dry season were initially unsuccessful. During rainy summers, when hydrologic land-water connectivity is enhanced by daily afternoon thundershowers and a high water table, nutrients in the watershed become closely linked to estuarine food webs, causing fish isotopes to become highly predictable—except in heavily urbanized areas. Upon closer examination, socio-economic factors within these urbanized areas were found to have strong predictive power during both rainy and dry seasons. A separate empirical model for urban areas was successful in predicting fish $\delta^{15}N$ based on a combination of septic tank density, human population density, and percent of population below poverty level. The isotopic influences of septic tank and population density are well understood, whereas the relationship with poverty is less obvious. We suggest poverty correlates with leaky plumbing and a reduced tendency to use fertilizer on lawns and ornamental plants. In general, we have found that our models fail in highly disturbed ecosystems and suspect that model deviation could be a measure of ecosystem deterioration in future studies.

U/Pb dating of zircons from the lower crustal xenoliths from Siberian kimberlites

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Zircons from seven lower crustal xenoliths from Siberian kinberlites have been dated *in situ* by U/Pb LAM-ICP-MS at the GEMOC National Key Centre, Macquarie University, Australia. The suite of studied samples comprises two granulites from the Udachnaya pipe and one granulite from the Leningradskaya pipe, (Daldyn kimberlite field), one granulite from the Yubileinaya pipe and three shists from the Komsomol'skaya pipe, (Alakit field).

Thirty eight zircon grains were extracted and analyzed from the granulite xenolith Ud-01-44 (Udachnaya). Most of the zircons give $^{207}Pb/^{206}Pb$ ages of 1.89 Ga and two grains give 2.5 Ga. Only four zircons have been found in the granulite xenolith Ud-01-66 (Udachnaya). They give a $^{207}Pb/^{206}Pb$ age of 1.79 Ga. Twenty zircon grains from granulite xenolith L-02-9 from the Leningradskaya pipe give a $^{207}Pb/^{206}Pb$ age of 1.9 Ga.

Six zircon grains from the granulite xenolith Yb-02-27 (Yubileinaya pipe) give a $^{207}Pb/^{206}Pb$ age of 1.86 Ga. Twelve zircon grains from the shist xenolith K-3-02 (Komsomol'skaya) give a $^{207}Pb/^{206}Pb$ age of 1.89 Ga. Seventeen zircon grains from the shist xenolith K-69-02 (Komsomol'skaya) give a $^{207}Pb/^{206}Pb$ age of 1.9 Ga. Three other grains give 2.9, 2.4, and 2.3 Ga. Nineteen zircon grains from the shist xenolith K-45-02 from the Komsomol'skaya pipe give a $^{207}Pb/^{206}Pb$ age of 1.84 Ga. Two grains give 2.3 Ga and one grain give 2.46 Ga.

Xenoliths of granulites and shists from the Paleozoic kimberlites provide the timing of major periods of lower crust formation in the Siberian craton in Archean and Proterozoic time. The Paleoproterozoic ages around 1.8-1.9 Ga correspond to a period of crustal reworking, and the collision between separate blocks of the craton, during the final assembly of the Siberian craton [1,2].

[1] Rosen *et al*. (1994) In: Condie, K.C. (ed.), Archean Crustal Evolution, 411-459. [2] Smelov and Timofeev (2007) *Gond. Research* **12**, 279-288.