Rate of growth of the preserved North American continental crust: Evidence from Hf and O isotopes in Mississippi detrital zircons

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Ninety-six concordant zircons from the mouth of the Mississippi River, which show no age zonation, were selected to represent six time U/Pb intervals previously identified from zircon dating, and analyzed for Lu-Hf and O isotope by laser ablation MC-ICP-MS and SHRIMP II, respectively. εHf_i values for the zircons show that the overwhelming majority of the grains crystallized from melted pre-existing continental crust, or mantle derived magmas that were contaminated by continental crust. The average Hf model age, if weighted by fraction of zircons in the river load, is1.94 Ga, but 2.35 Ga if weighted by area, which compares with equivalent Nd model ages of 1.7 Ga and 2.36 Ga respectively. Our preferred approach is to use the measured O isotope values to constrain variations in the $^{176}Lu/^{177}Hf$ ratio of the granitic source region from which the zircons crystallized. This method gives an average Hf model age of 2.53 Ga.

The Halmyrolisis Effects on the mantle derived rocks in productive water on St. Paul's Rocks, Equatorial Atlantic

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Geochemical Remobilization

The sedimentary cycle, the main phenomenon that stimulate the chemical mobility of the elements from the oceanic rocks is the halmyrolisis process [1, 2] and many of these chemical elements show a strong influence on biota [3], principally the elements that participate in the photosynthesis, respiration and nutrition of the livings creatures (e.g: soluble complex of C, N, S, P and Si) and in the electrolytic equilibrium of tissues (e.g: Na, K, Ca, Mg and Cl) or in the catalysis of the aquatic photosynthesis (e.g: P, Cu, Co, Fe, Mo, V, Mn, etc). The phosphorus abundance is an important factor in the aquatic photosynthesis and in the formation of sedimentary phosphorites. That suggests a close relation between halmyrolosis, phosphogenesis and the biota proliferation with the geological evolution [4, 5].

Discussion of Results

In this context, we can consider the halmyrolisis of the mantle derived rocks from the St. Peter and St Paul archipelago (SPSPA-Atlantic Equatorial, 0°55′01″N, 29°20′44″W) as a determinative factor in the fertile seewater that surrounds this archipelago. The waters of the deep oceanic layers associated closely to the *new production*; the turbulent or advective entrance of nutrients in the photical layer, will feed the planktons of the most superficial layers, as well as the fishs, seaweed and chorales that grow incrusted on the rocks from SPSPA. Our whole rock geochemical data and mass-balance calculations show that the halmyrolisis caused gains and losses in all major elements and induced some remobilization in trace elements.

The redistribution of these elements shows a increase on the water of SiO_2, $_{Total}Fe_2O_3$, MgO, Na_2O, K_2O, Ni, Nb, Y, V, L-REE. Re, Pd.

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