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Potamochemistry and the Gross Erosion Processes of Continents

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Large rivers are to continental erosion process what Basalts are to magmatic and mantle processes: they integrate for a large domain the different processes into final results which are geochemically significant. Over the last ten years, we have developed a systematic approach of the river chemistry which includes

• Isotopic approach: Sr, Nd, Pb, Os, B, ^{230}Th, ^{226}Ra, ^{234}U

• Major elements and trace elements systematics applied both: - on the dissolved load - on the particulate rivers on various conditions have been studied

• Different geological conditions: shields, oceanic islands, orogenic belt, large continents;

• Different climatic conditions: tropical, moderate, arctic. A new picture about continental erosion emerges which extends but also change drastically the Garrels' approach. The erosion sources can be determined accurately both in terms of lithology or in geological age. Such approach permit a computation of average continental inputs. The erosion regime in regard to steady state can be determined in all case including the computation of erosion rates. With such data the CO_2 pumping estimate can be computed. The data on particulate versus dissolved load permit to determine in each case the degree of alteration. The chemical-mechanical relationship can be established by using global relationship between chemical-mechanical erosion rate, runoff, mean temperature, mean elevation etc...