



Rivers, messengers from continental surfaces

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Rivers collect the products of interaction between the continents, the biosphere and the atmosphere. If the chemical composition of rivers is first controlled by the nature of rocks, the role of climate, biospheric processes and tectonics can be illustrated by a couple of examples. More and more examples show that river composition is responding to global changes, although the reasons of these changes are not clear.

A clue is offered by carbonate weathering in the Jura mountains. The Jura mountains is a interesting natural laoratory where climate is changing along a W-E gradient, at constant carbonate lithology. The chemistry of rivers and springs is changing according to this change in climate, but the data can not be explained by the variations of thermodynamic properties of water-rock interactions. The production of acidity by soils seems to be the key controlling factor. A model taking into account soil hydrology, biological productivity and soil respiration is able to explain the data and shows that the production of CO₂ in soils by root respiration and organic matter decomposition is the main driver of carbonate dissolution.

Refined models coupling chemical weathering reactions, soil hydrology and organic matter decomposition are necessary, which, coupled with longterm monitoring of well chosen rivers, will allow us to understand more about the role of riverine export to the ocean, the importance of rivers in the global carbon cycle an the response of continental surfaces to global changes.