A Shifting View of Erosion and the Carbon Cycle

Erosion and carbon transfers by weathering and erosion: Net “rock to atmosphere” CO₂ transfers by erosion and weathering:

- from the atmosphere by: a) silicate weathering; and b) erosion of biospheric organic carbon; and the CO₂ oxidative weathering of sulphide minerals and rock organic carbon.

Generally, increased erosion impacts all the main geochemical carbon transfers, both CO₂ sources from c) sulphide oxidation; and d) rock organic carbon (OCpetro) oxidation.

We now recognise the importance of CO₂ drawdown by organic carbon burial, in addition to CO₂ sources from oxidative weathering of sulphide minerals and rock carbon.

Globally, the traditional view has pitched volcanic CO₂ release, versus silicate weathering CO₂ drawdown.

Erosion and carbon transfers by weathering and erosion:

-物理剥蚀率 (t km⁻² yr⁻¹)
-悬浮物质冲刷量 (t km⁻² yr⁻¹)

The scatter reflects important role of varying climate, lithology, geomorphic setting.

Net “rock to atmosphere” CO₂ transfers by erosion and weathering:

For a few catchments, the net “rock to atmosphere” carbon transfer can now be quantified.

There is a major role of erosion rate (increases fluxes), climate (moderates weathering fluxes) and lithology in setting the magnitude of CO₂ source or sink.

Generally, increased erosion impacts all the main geochemical carbon transfers, both CO₂ sinks from the atmosphere by: a) silicate weathering; and b) erosion of biospheric organic carbon, and the CO₂ sources from c) sulphide oxidation; and d) rock organic carbon (OCpetro) oxidation.

Organic carbon burial = 170

Inorganic carbon

Global Biogeochemical Cycles

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