

Sourcing and Long-Range Bedload Transport of Fluvial Particulate Organic Matter: Rio Bermejo, Argentina

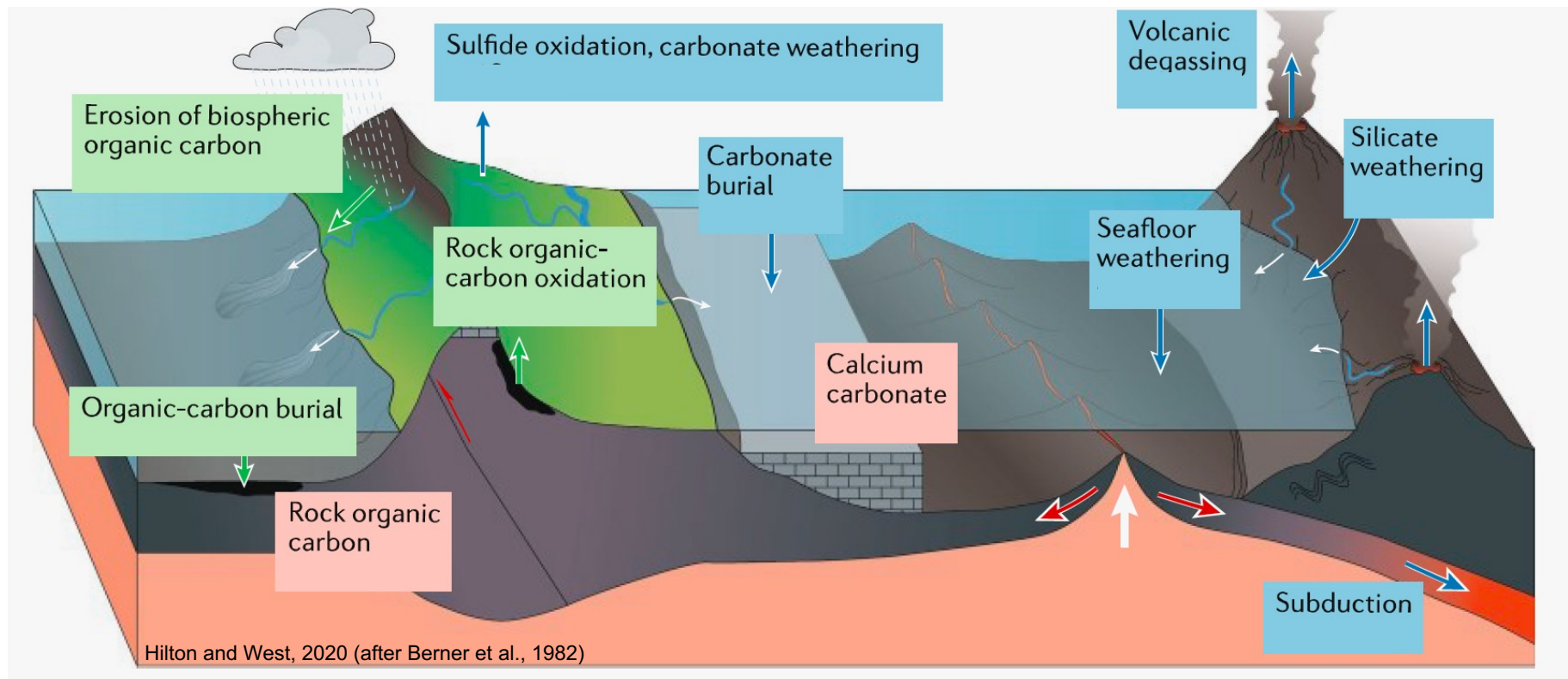
Sophia Dosch^{1,2}, Niels Hovius^{1,2}, Marisa Repasch^{2,3}, Joel Scheingross⁴,
Jens Turowski², Dirk Sachse²

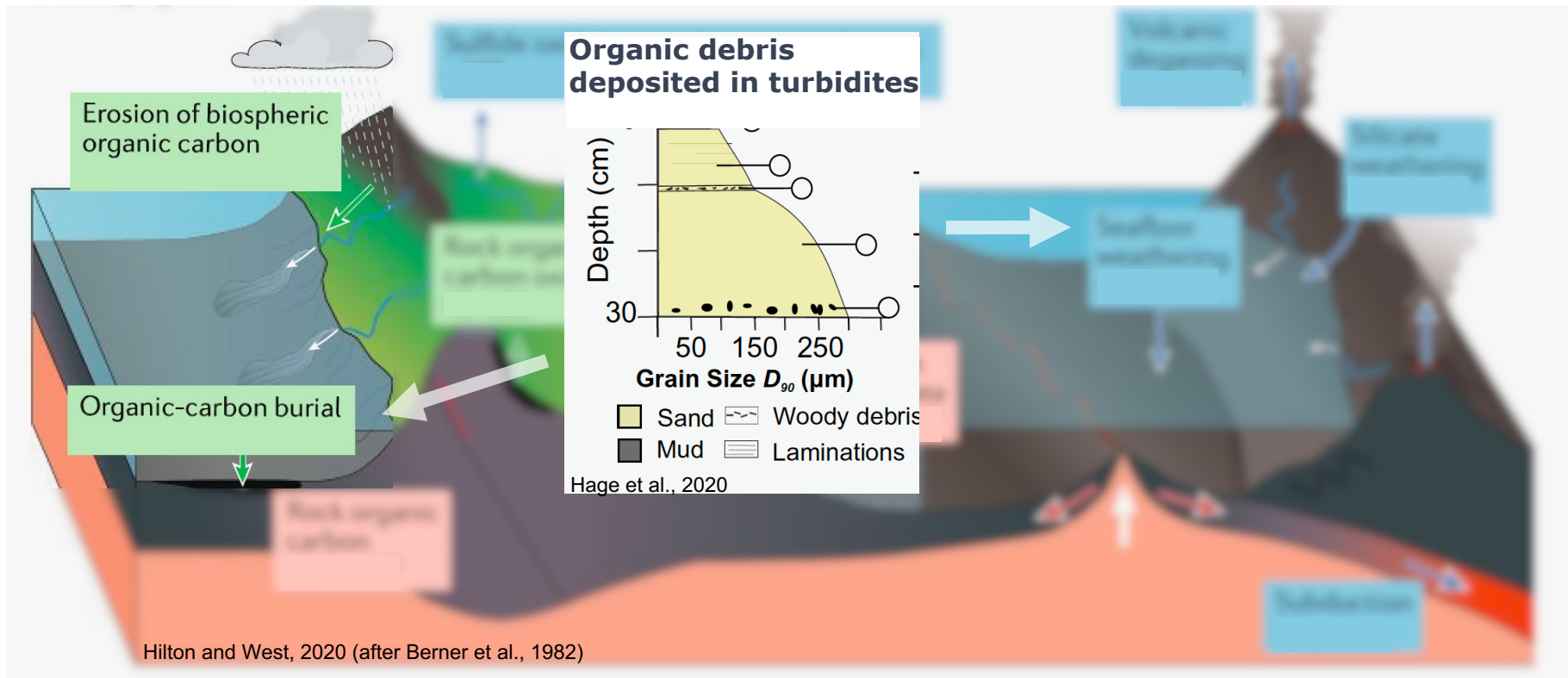
1 Institute of Earth and Environmental Science, University of Potsdam, Potsdam, Germany,

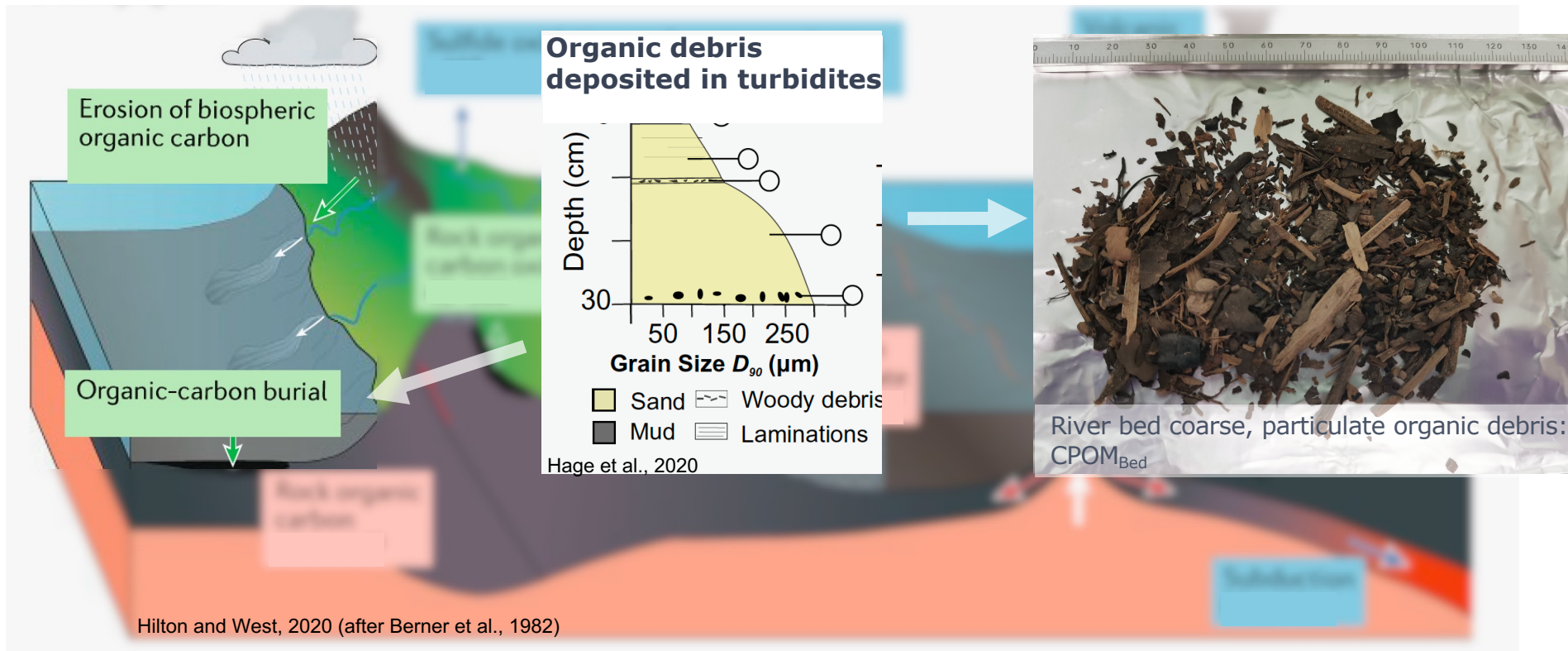
2 GFZ German Research Centre for Geosciences, Helmholtz Centre Potsdam, Potsdam, Germany

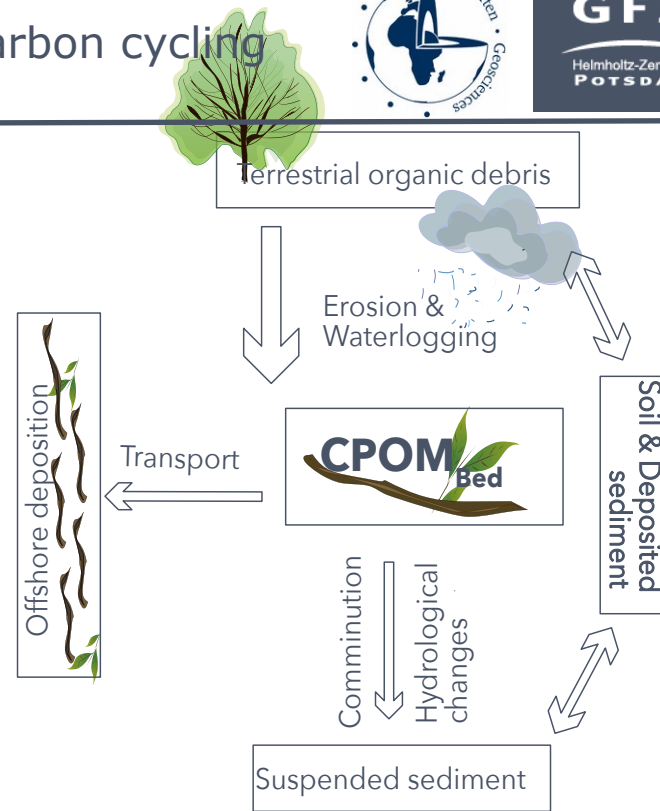
3 University of Colorado Boulder, USA

4 University of Nevada, Reno







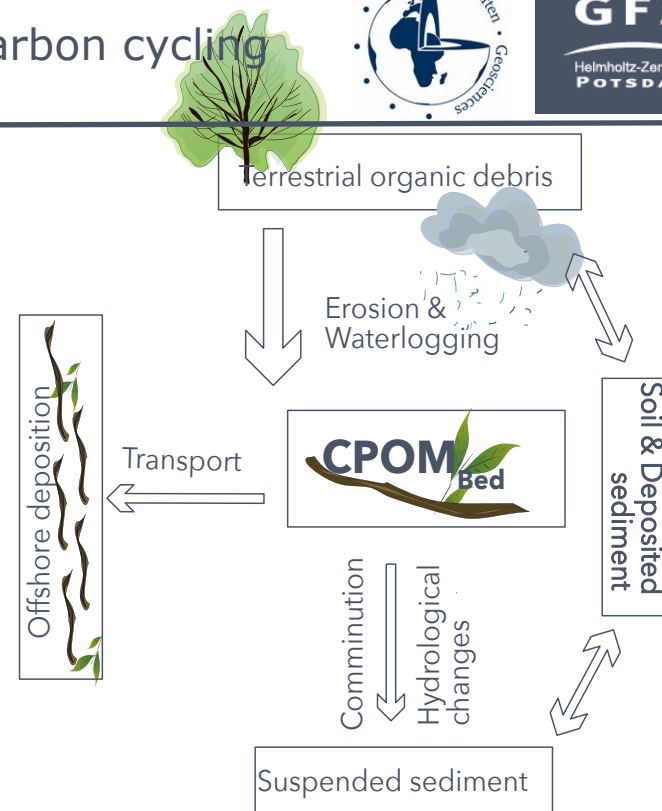


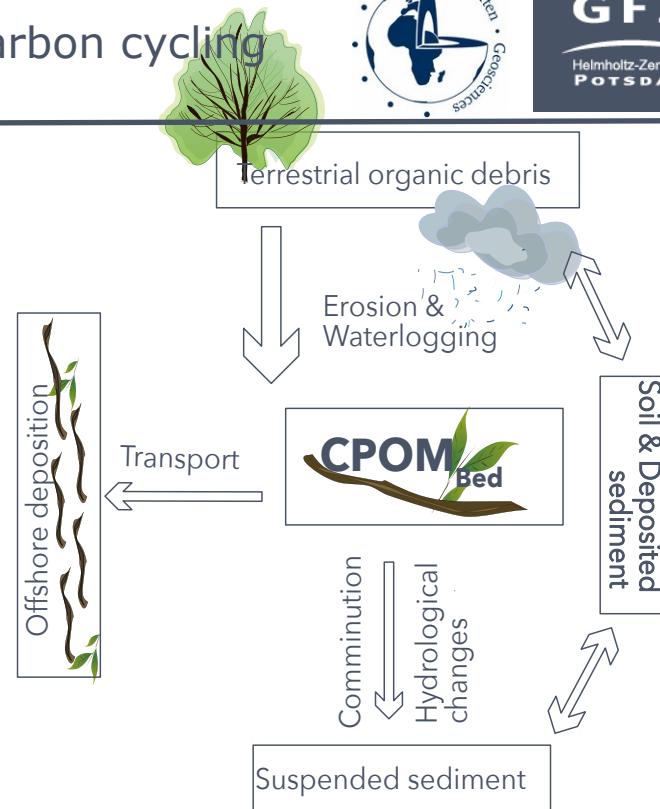
① **SOURCE, TRANSPORT**

Where is CPOM_{Bed} derived from?

Does it survive long-distance transport?

Is there a source change along the fluvial transit?





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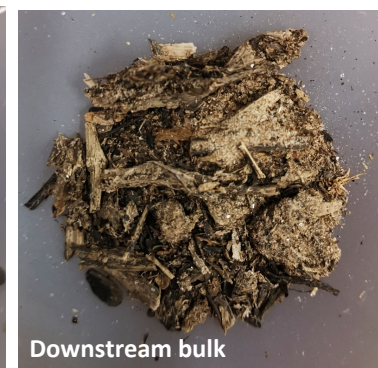
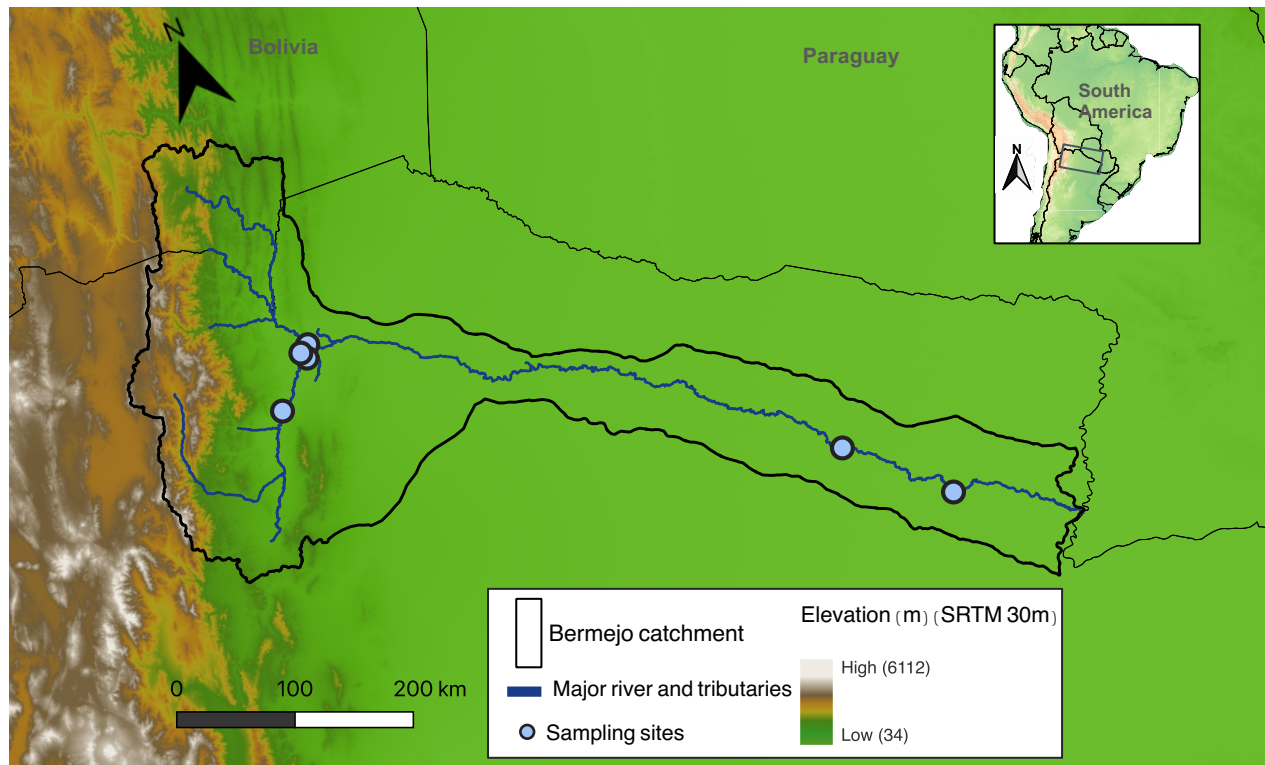
2 & FATE

What is the role of CPOM_{Bed} in the OC cycle?

How is it connected to sediment routing?

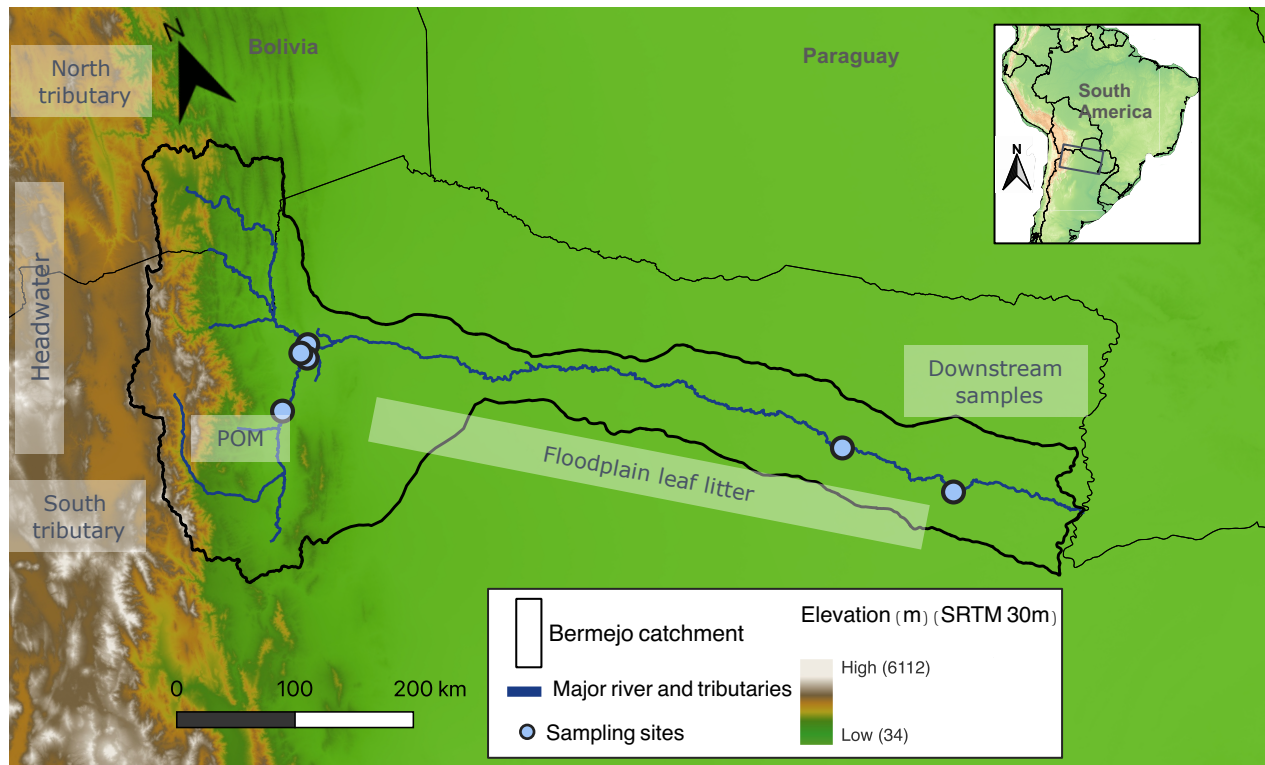
What are the implications for the OC cycle?





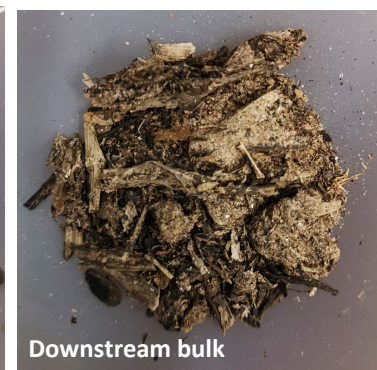
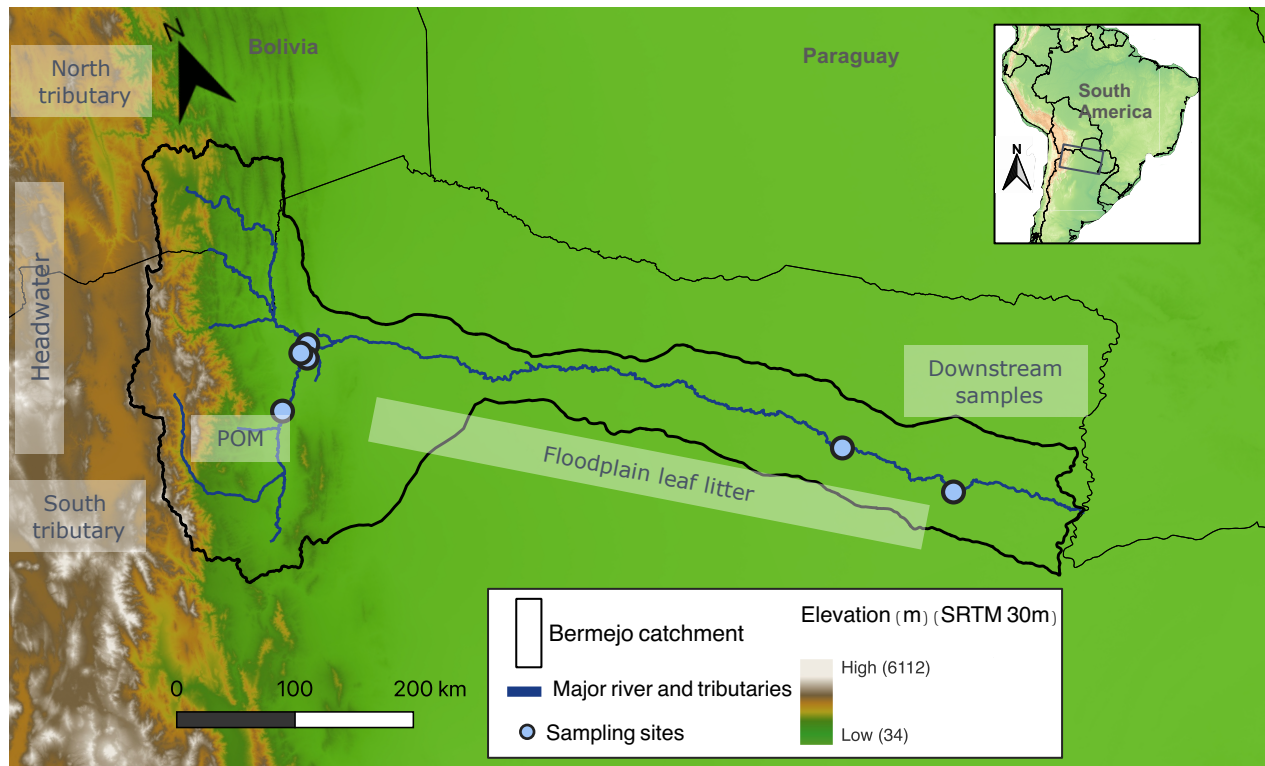
POM: Particulate Organic Matter at the river surface

CPOM_{bed}: Coarse Particulate Organic Matter, transported at the river bed



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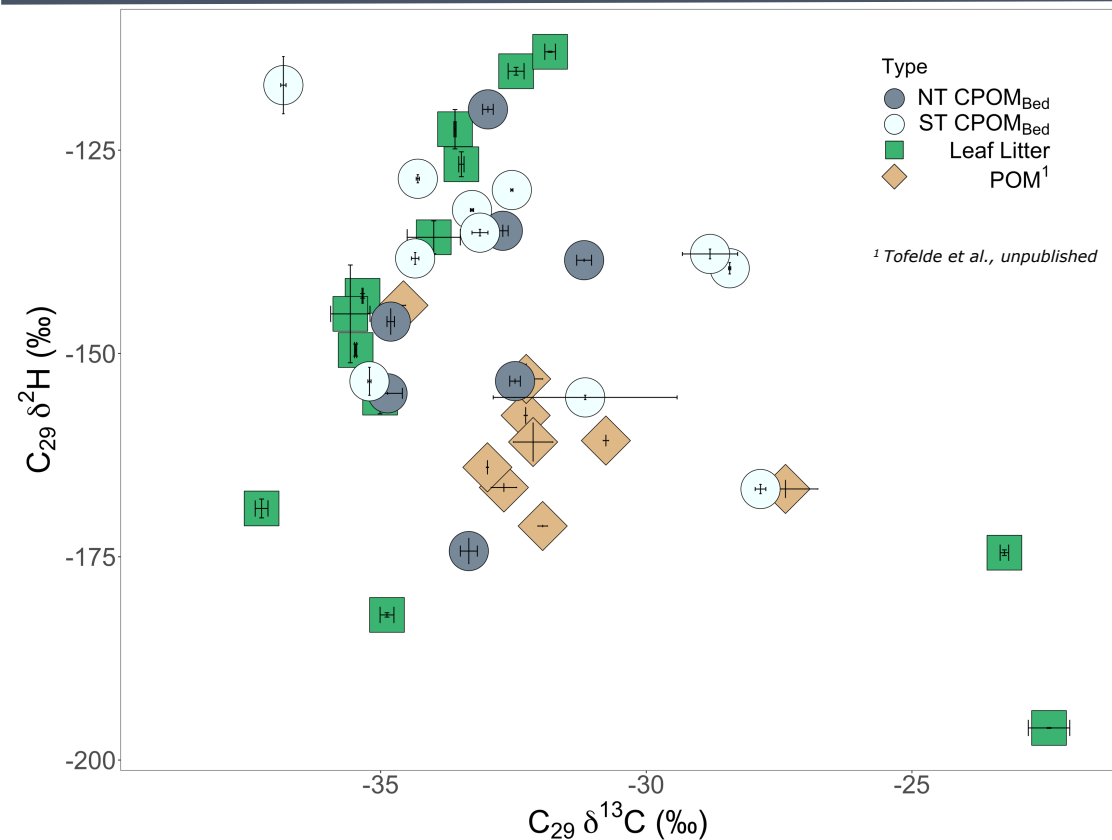
Long-chain n-alkanes:
Leaf wax biomarker that we use
as organic proxies for the
source of organic matter



$\delta^{13}\text{C}$ and $\delta^2\text{H}$ help us to deduce
the source of CPOM_{bed}

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(1) Floodplain Leaf litter,

(2) Headwater POM,

(3) Headwater:

North / South Tributary CPOM_{Bed}

Long-chain n-alkanes:

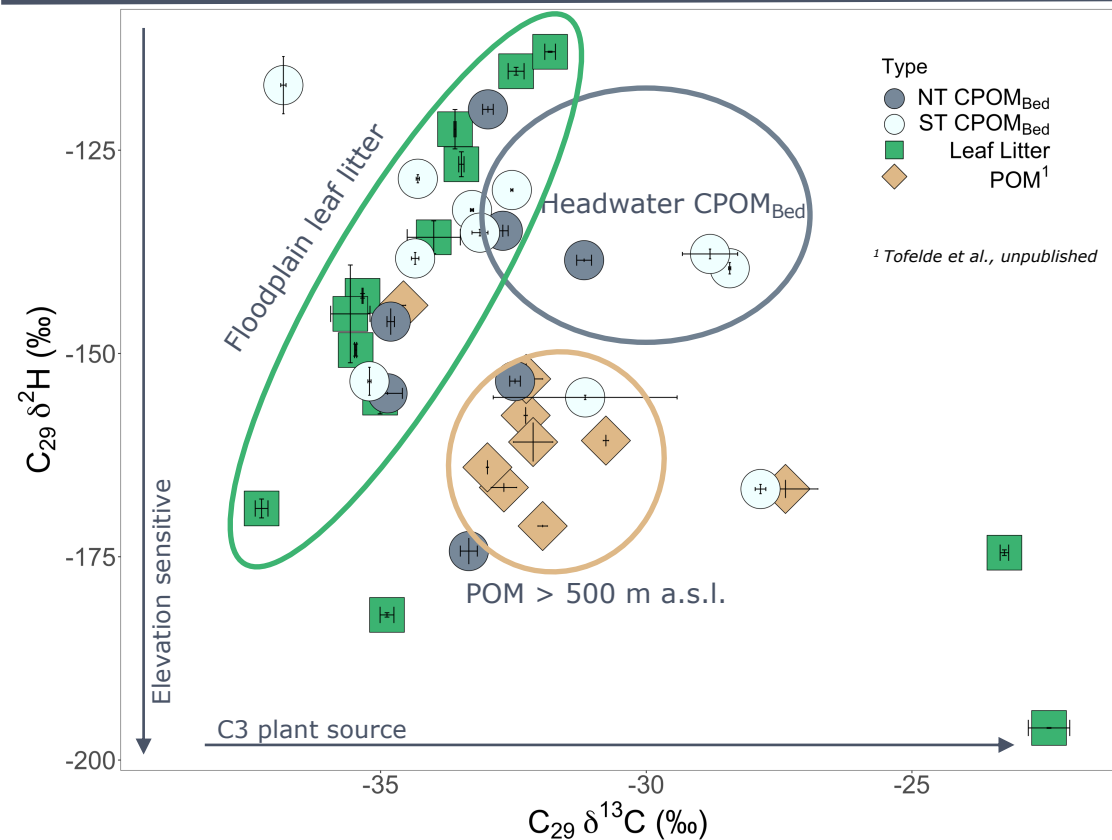
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- Higher elevation POM with lighter $\delta^{2}H$ values
- CPOM_{Bed} values similar to leaf litter
- Heavy $\delta^{13}C$ and $\delta^{2}H$ CPOM_{Bed} possibly from distal sources

Long-chain n-alkanes:

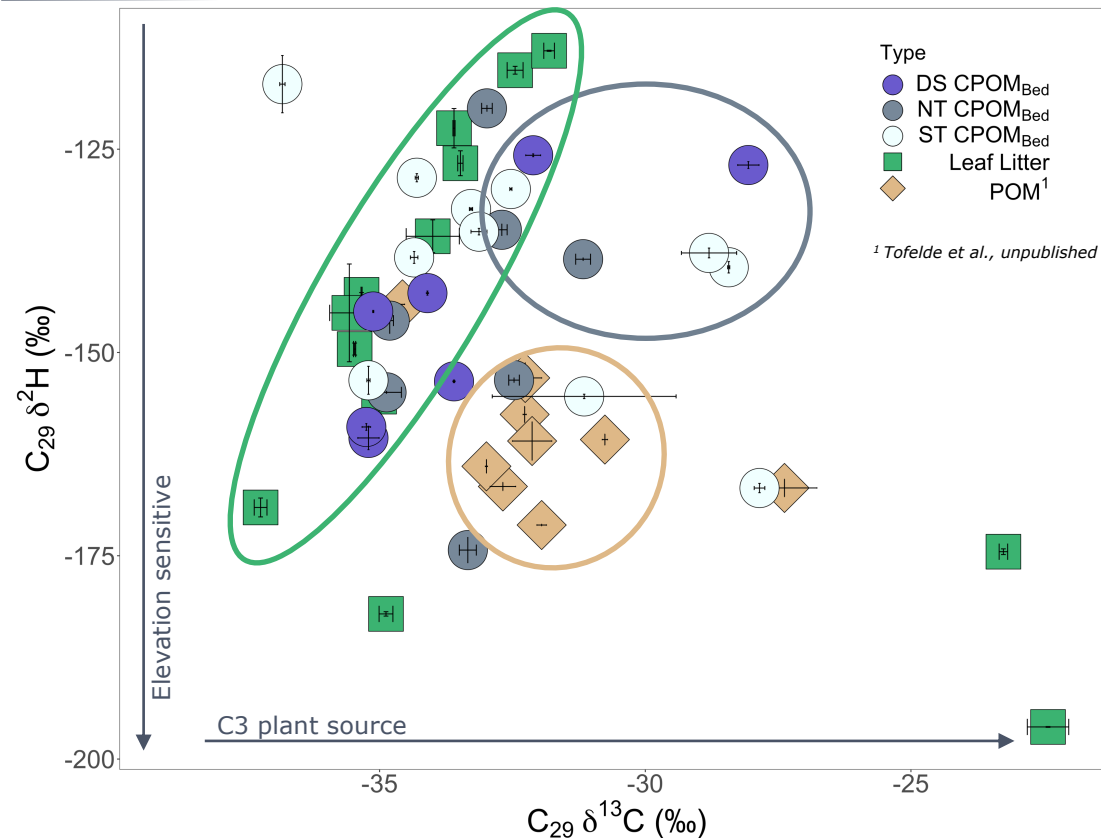
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- High overall variability of CPOM_{Bed} samples
- CPOM_{Bed} follows in general distribution of catchment leaf litter and upstream CPOM_{Bed}
- Some downstream samples only explainable by headwater CPOM_{Bed}

Headwater signature in downstream samples suggests long-range bedload transport with few mixing

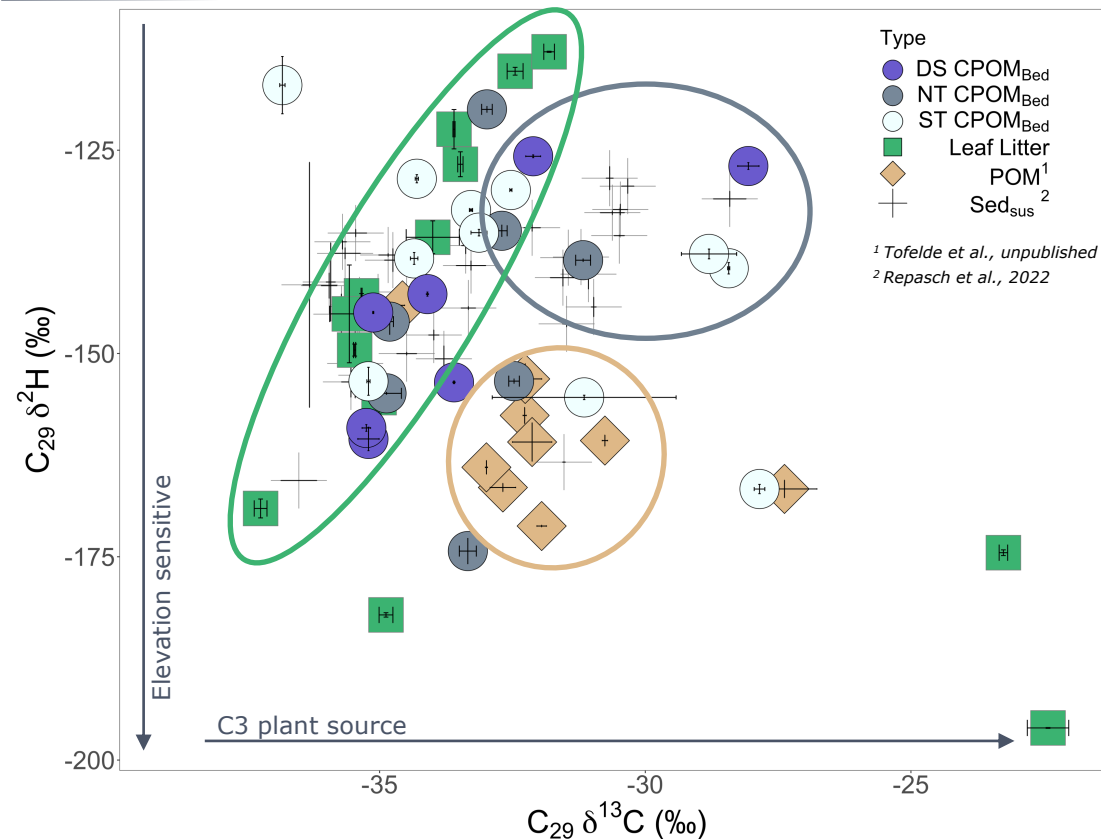
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- Higher variability in CPOM_{Bed} as in suspended sediment
- General trend as of CPOM_{Bed}

CPOM_{Bed} comminution during long-distance fluvial transport might contribute to the river suspended sediment load

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Submerged organic debris can **survive long-distance bedload transport**. After entering a depositional regime it could contribute to **draw down catchment-wide organic carbon**

① SOURCE, TRANSPORT

② & FATE

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Where is $CPOM_{Bed}$ derived from?

Mix from **headwater sources** and **floodplain**
input

Does it survive long-distance transport?

$CPOM_{Bed}$ **survives long-range bedload**
transport

Is there a source change along the fluvial transit?

Continuous recruitment from the floodplain

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What is the role of $CPOM_{Bed}$ in the OC cycle of the RB floodplain?

Export of organic debris & contribution to suspended load

How is it connected to sediment routing?

Transport as batches of $CPOM_{Bed}$ with **only few mixing**

What are the implications for the OC cycle?

Long-range $CPOM$ bedload transport is a path of **catchment-wide carbon distribution** and draw down



Thank you

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