

# Mass Fluxes of Nitrogen and Carbon from Soil Water to a First-Order Mountain Stream in a Pristine Costa Rican Rain Forest in Response to Individual Rain Events

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## 1. Introduction

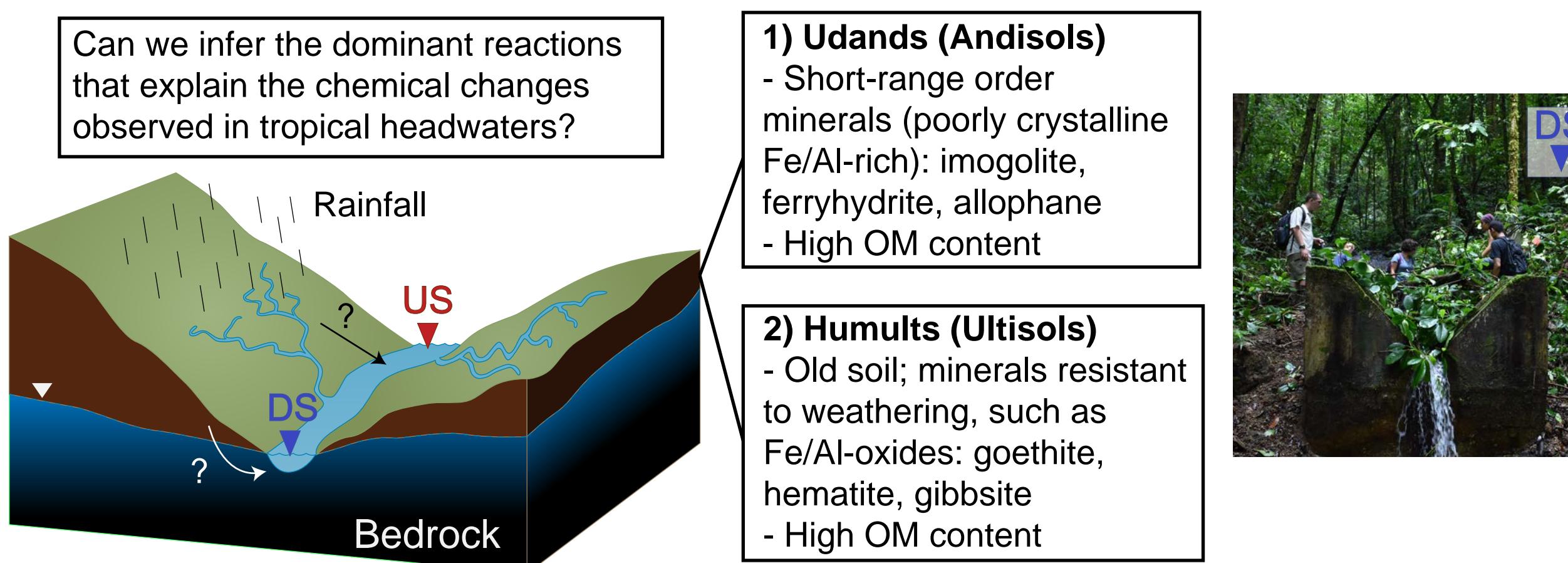


Figure 1. A) Schematic cross section of study watershed with description of prominent soil types along hillslopes and differential stream gauging sites: upstream (US) and downstream (DS). B) field picture of V-notch weir located as DS.

What are the fractional contributions from soil water to stream discharge and net mass fluxes of carbon and nitrogen over 48 hours?

## 2. Study Site & Methodology

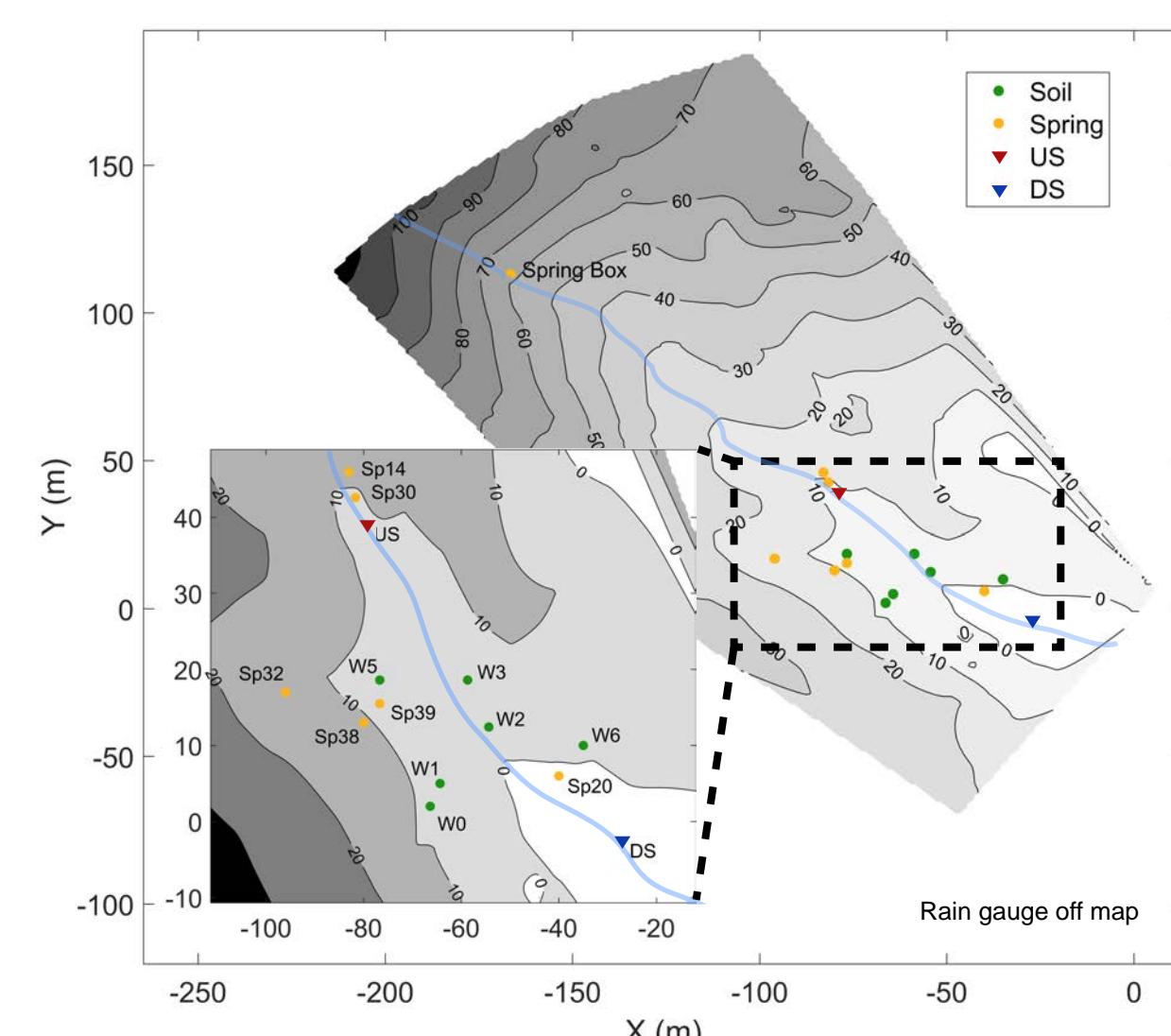


Figure 2. Topographic map of study site and sampling locations: US (red), DS (blue), W (soil water wells; green), and Sp (spring seeps; yellow).

1. What's in the water?  
→ Field sampling and chemical analyses
2. What are the fractional contributions from the sources?  
→ End Member Mixing Analysis (EMMA)  
→ Hydrograph separation
3. What are the processes that lead to the final solution chemistry?  
→ PHREEQC  
→ Inverse Modeling

## 3. Ambient Stream Conditions

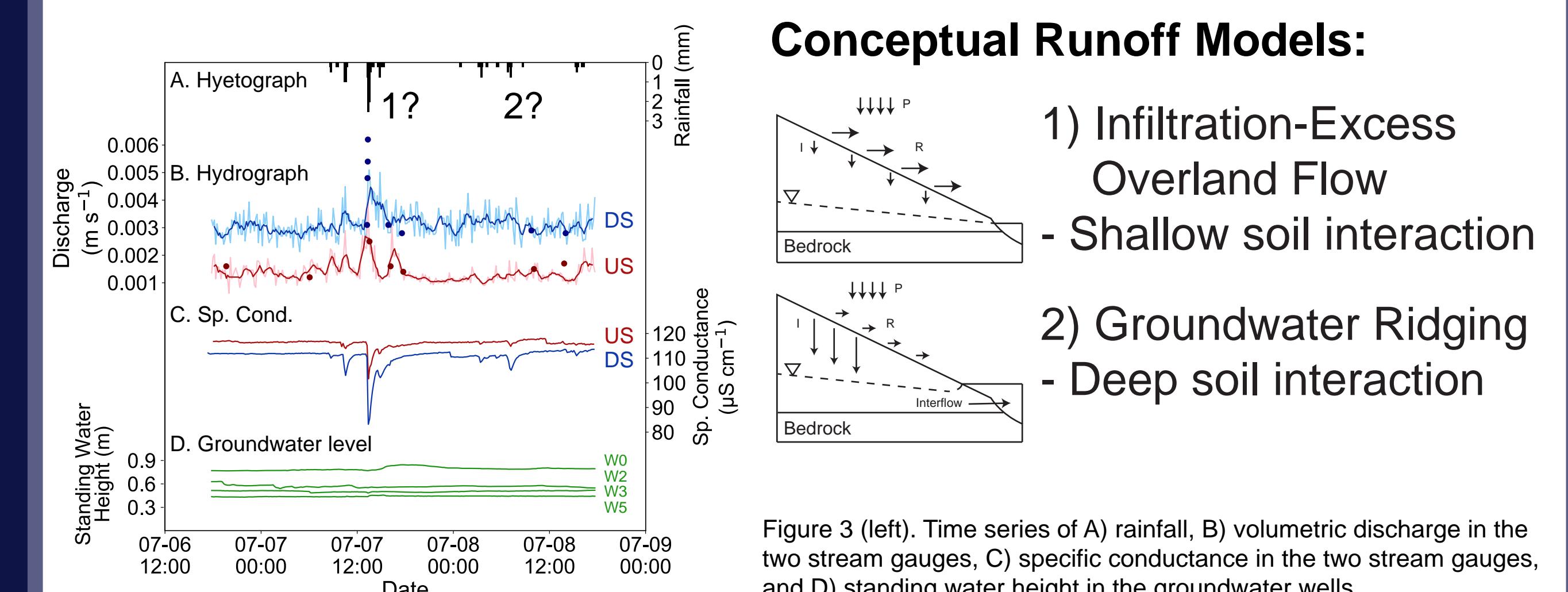


Figure 3 (left). Time series of A) rainfall, B) volumetric discharge in the two stream gauges, C) specific conductance in the two stream gauges, and D) standing water height in the groundwater wells.

## 4. EMMA

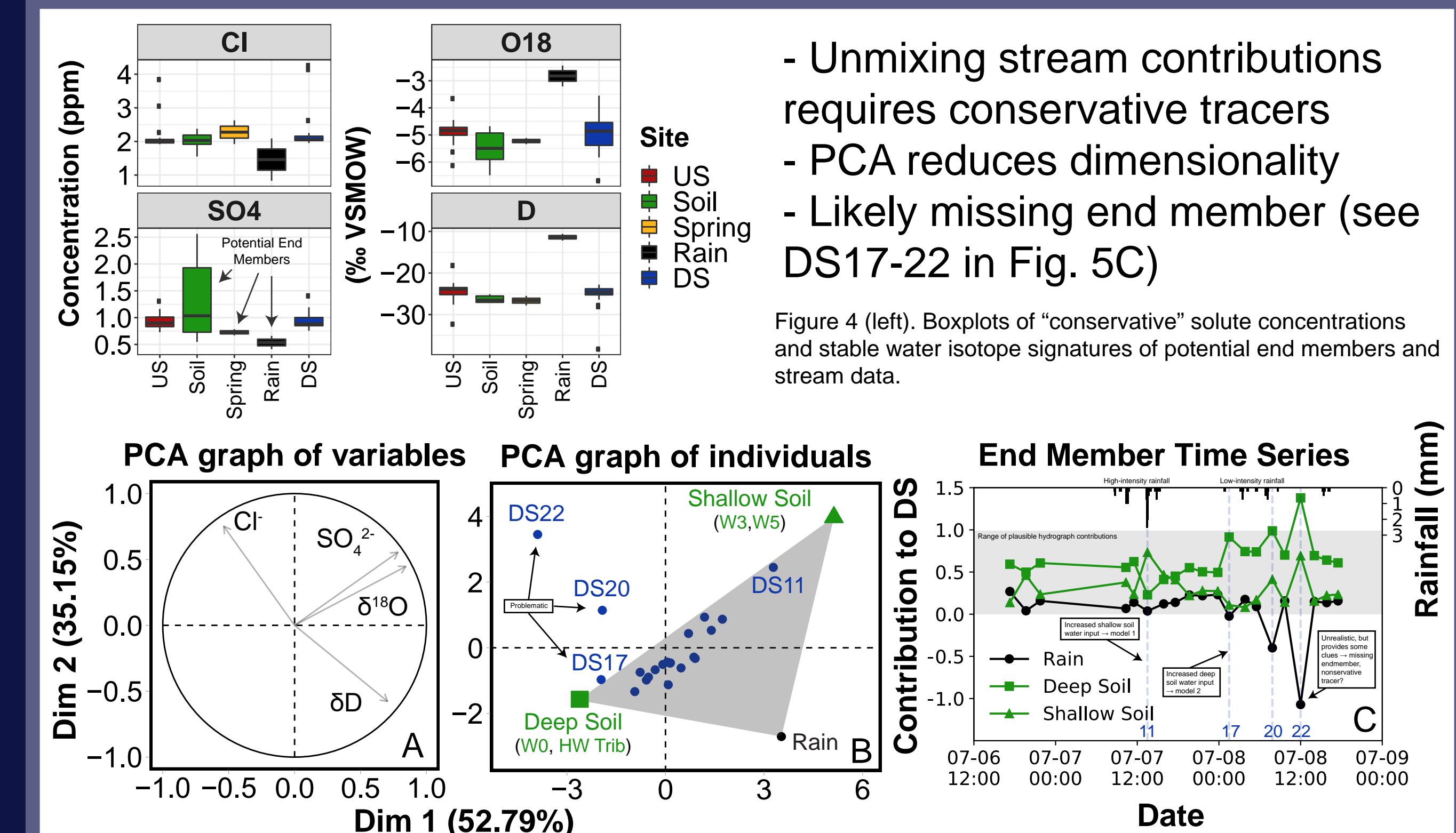


Figure 4 (left). Boxplots of "conservative" solute concentrations and stable water isotope signatures of potential end members and stream data.

Probable evidence of both shallow and deep soil water input to streams

## 5. Inverse Modeling

## 6. Key Findings

- Cation exchange (Na/Ca)?
- Precipitation of clays?
- Organic matter dissolution/precipitation?
- Several mechanisms contribute to the chemical evolution of carbon and nitrogen species in the surface waters of tropical forests
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## 7. Acknowledgements & More!

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