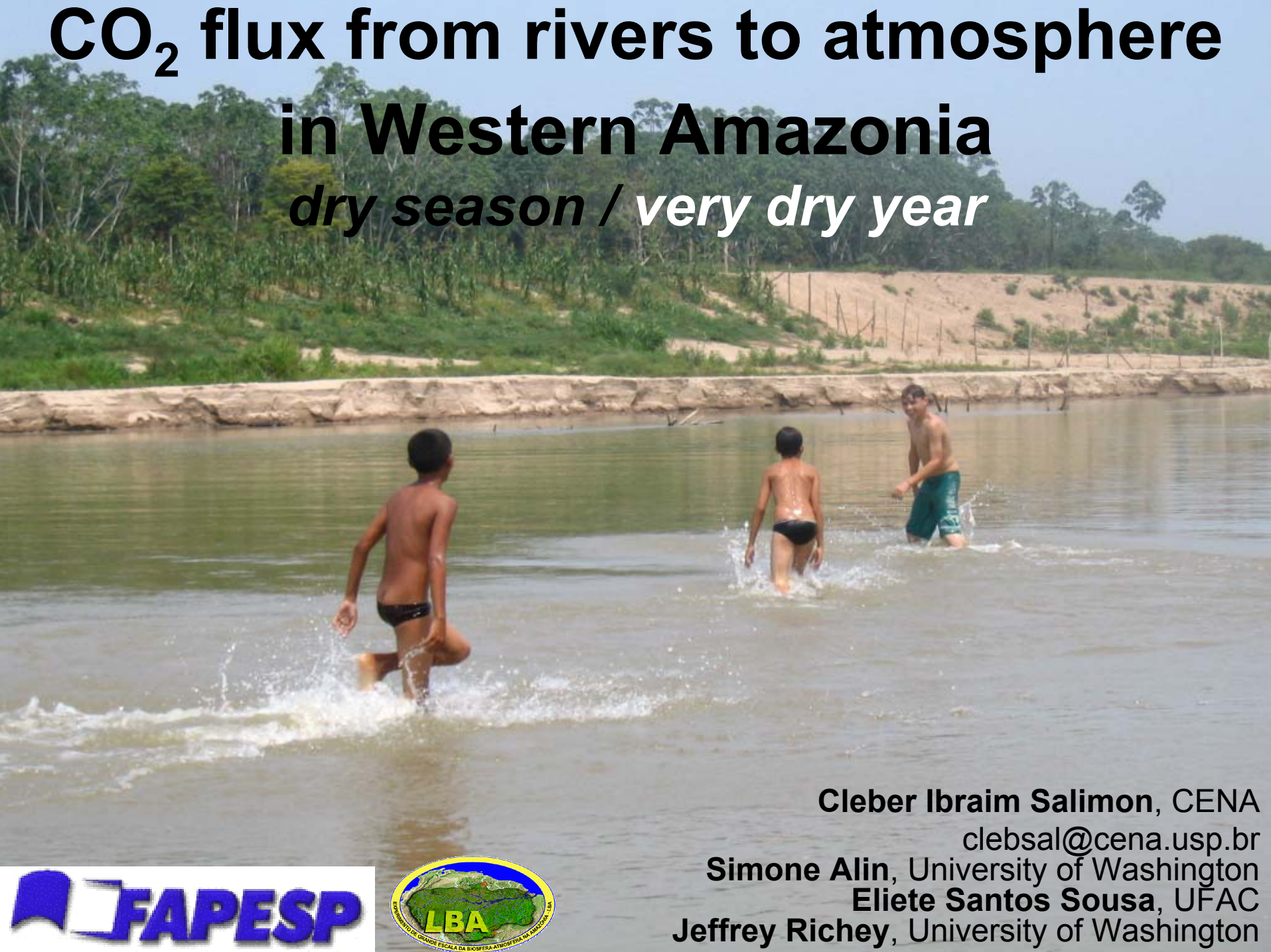
CO_2 flux from rivers to atmosphere in Western Amazonia

dry season / very dry year



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Southwestern Amazonia – Acre

Ombrophilous Open Forest dominated by bamboo/palms

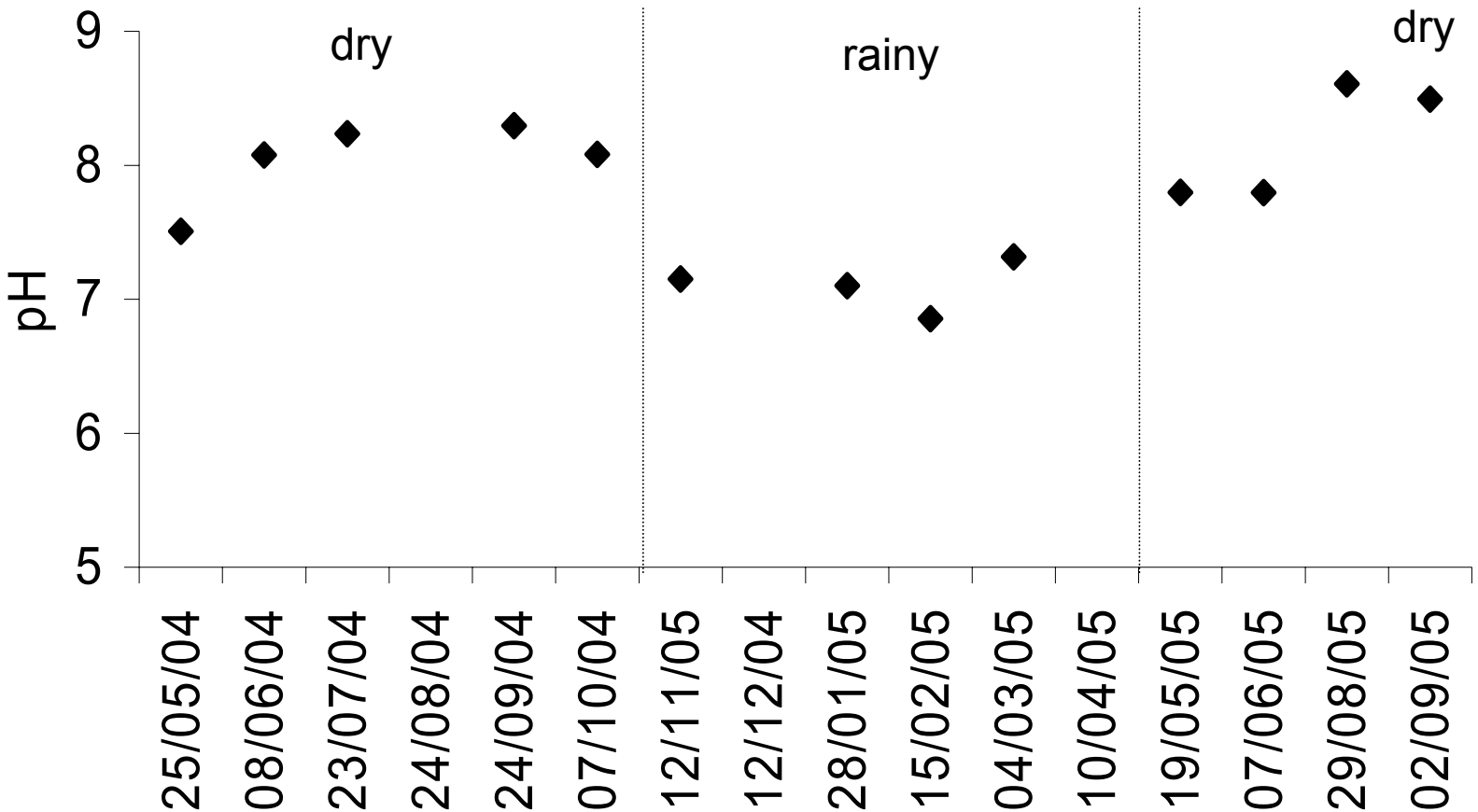
Southwestern Amazonia – Acre

- Most margins are occupied by humans

Southwestern Amazonia – Acre

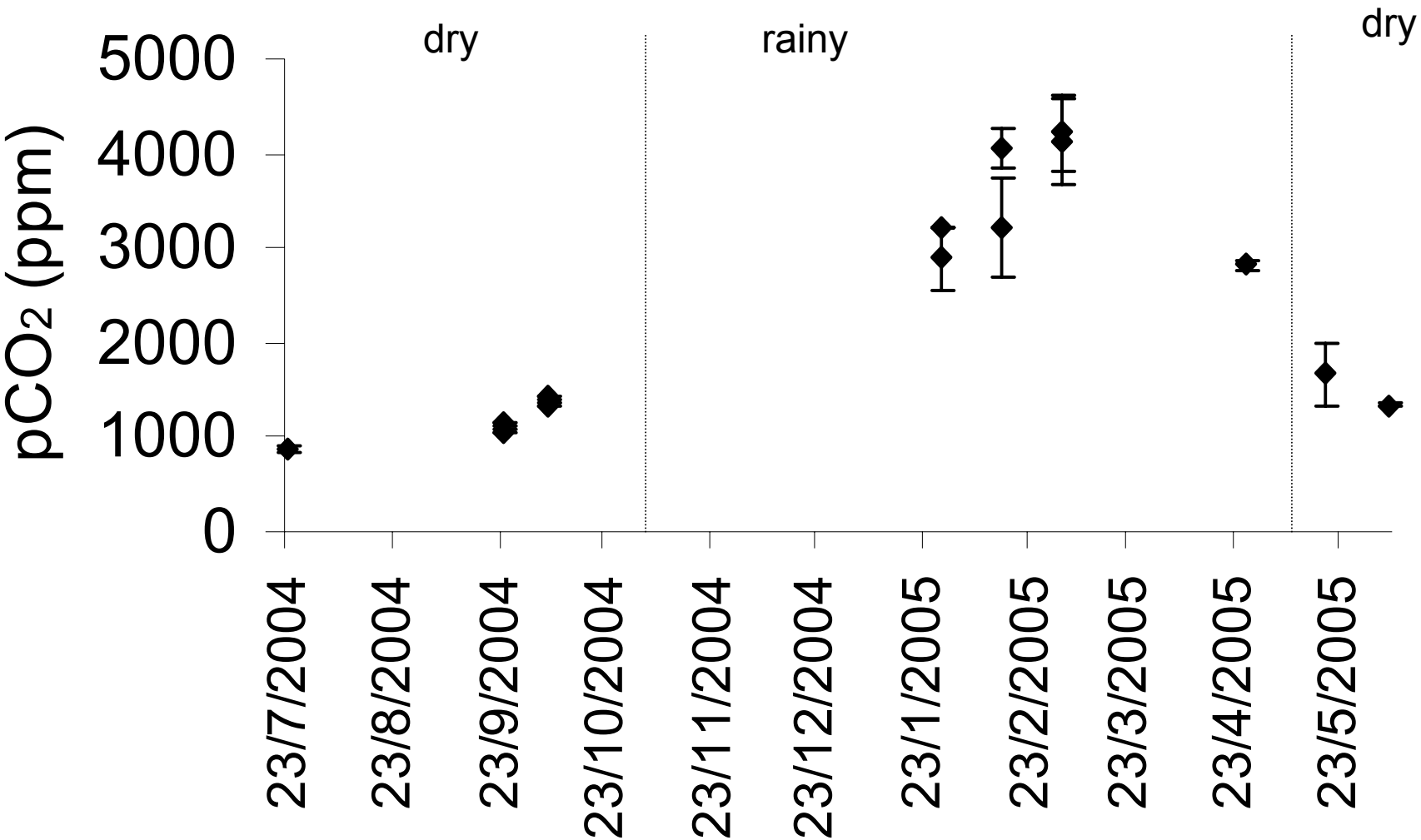
- Rivers are very seasonal

Purus (rivers) 6.8 < pH >8.6 (oceans)



Southwestern Amazonia – Acre

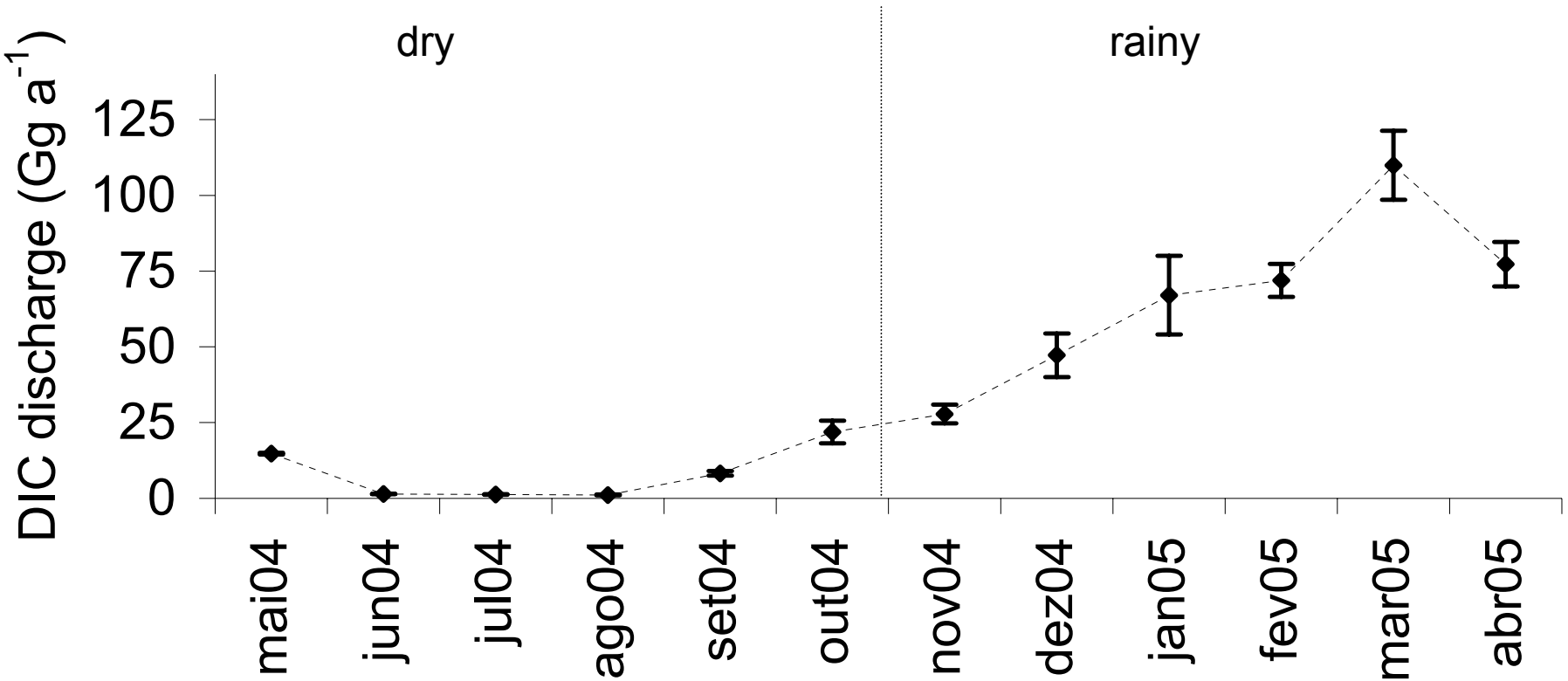
- pCO_2 very seasonal (pH and metabolism driven)



Southwestern Amazonia – Acre

Dissolved inorganic carbon discharge in Upper Purus

(paleo history of the basins drives pH seasonality?)



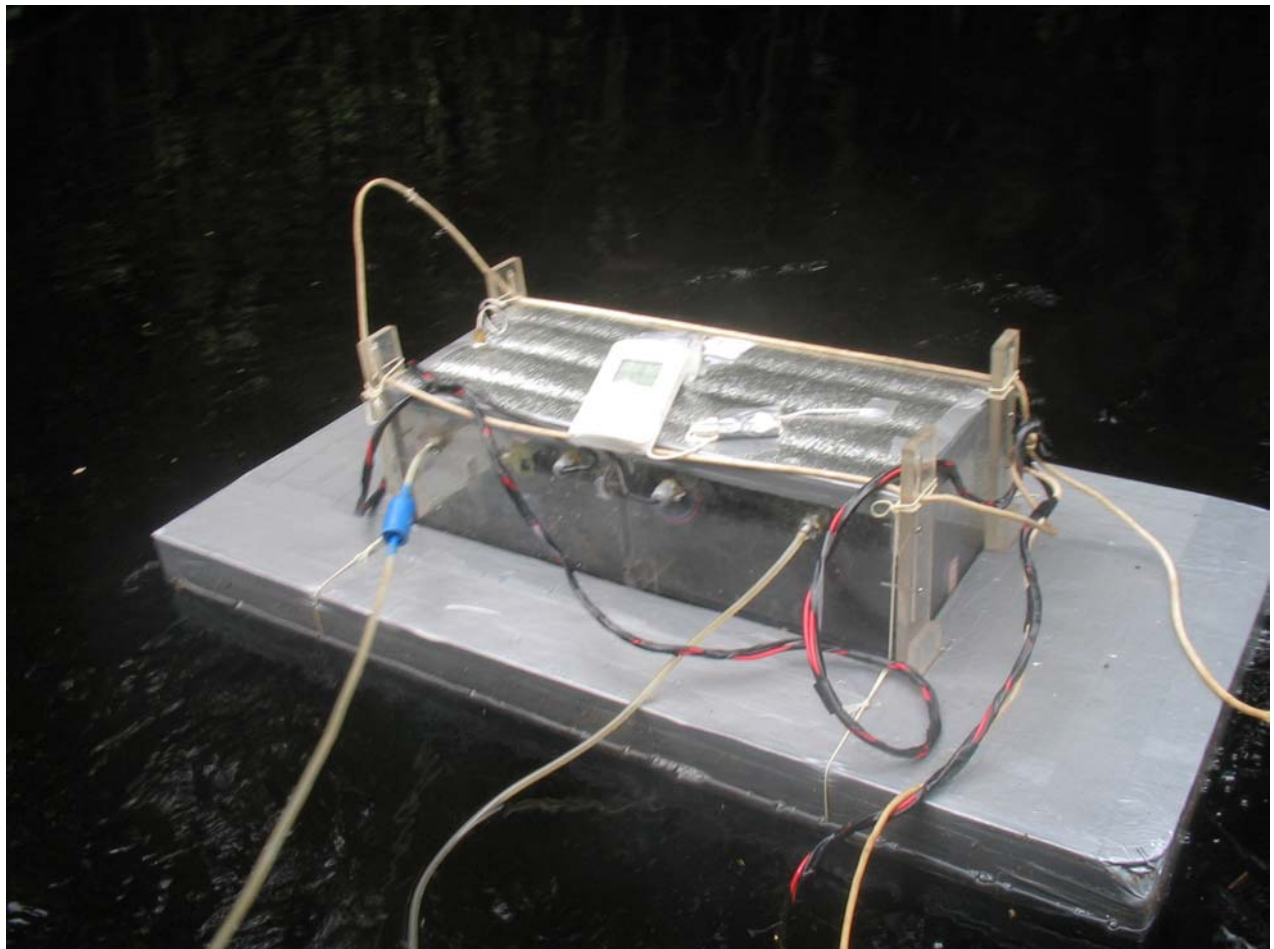
CO_2 flux from rivers to atmosphere *DRIVERS*

- air and water turbulence (boundary layer)
- pH variation
- Respiration rate
- Photosynthetic rate
  - *CO_2 consumption by algeae ???*
- chamber effect??
- what else?

CO_2 flux from rivers to atmosphere
METHODS

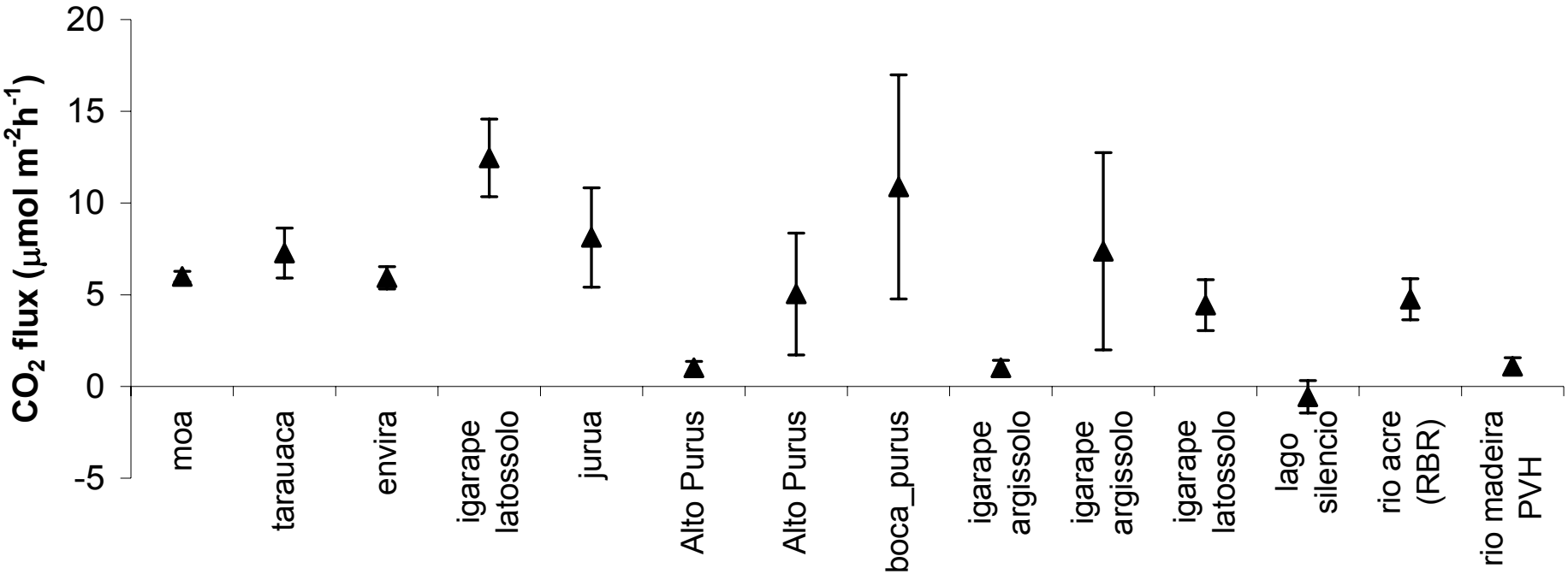
- IRGA attached to a floating chamber with fan and baffle to simulate air flow

- fan speed controled
- Vent to equilibrate air pressure with atm

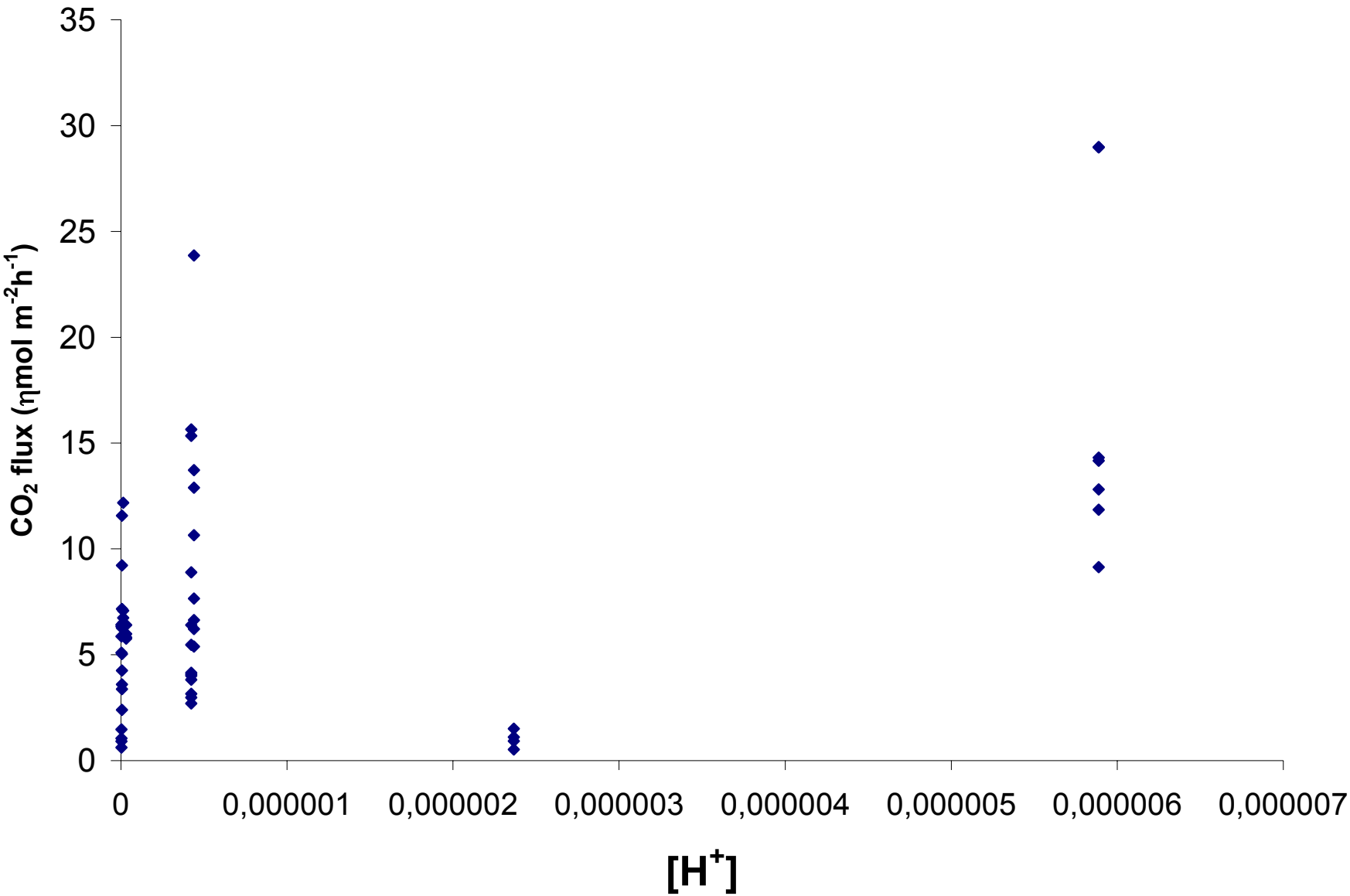


CO_2 flux from rivers to atmosphere
the data so far

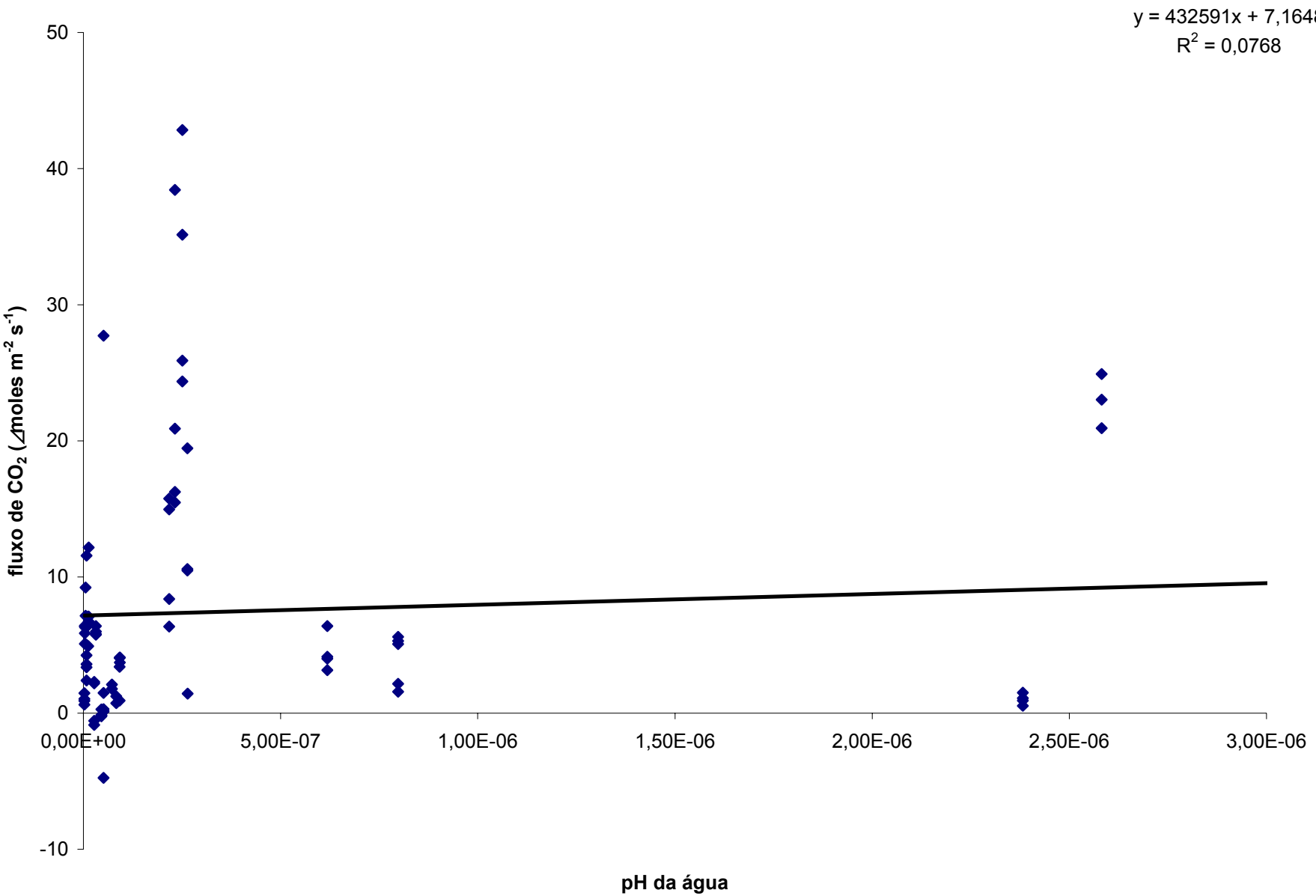
- $-1.1_{(lake)} < CO_2$ flux $> 23.7_{(mouth\ of\ Purus)}$ (μmol CO_2 $m^{-2}h^{-1}$)



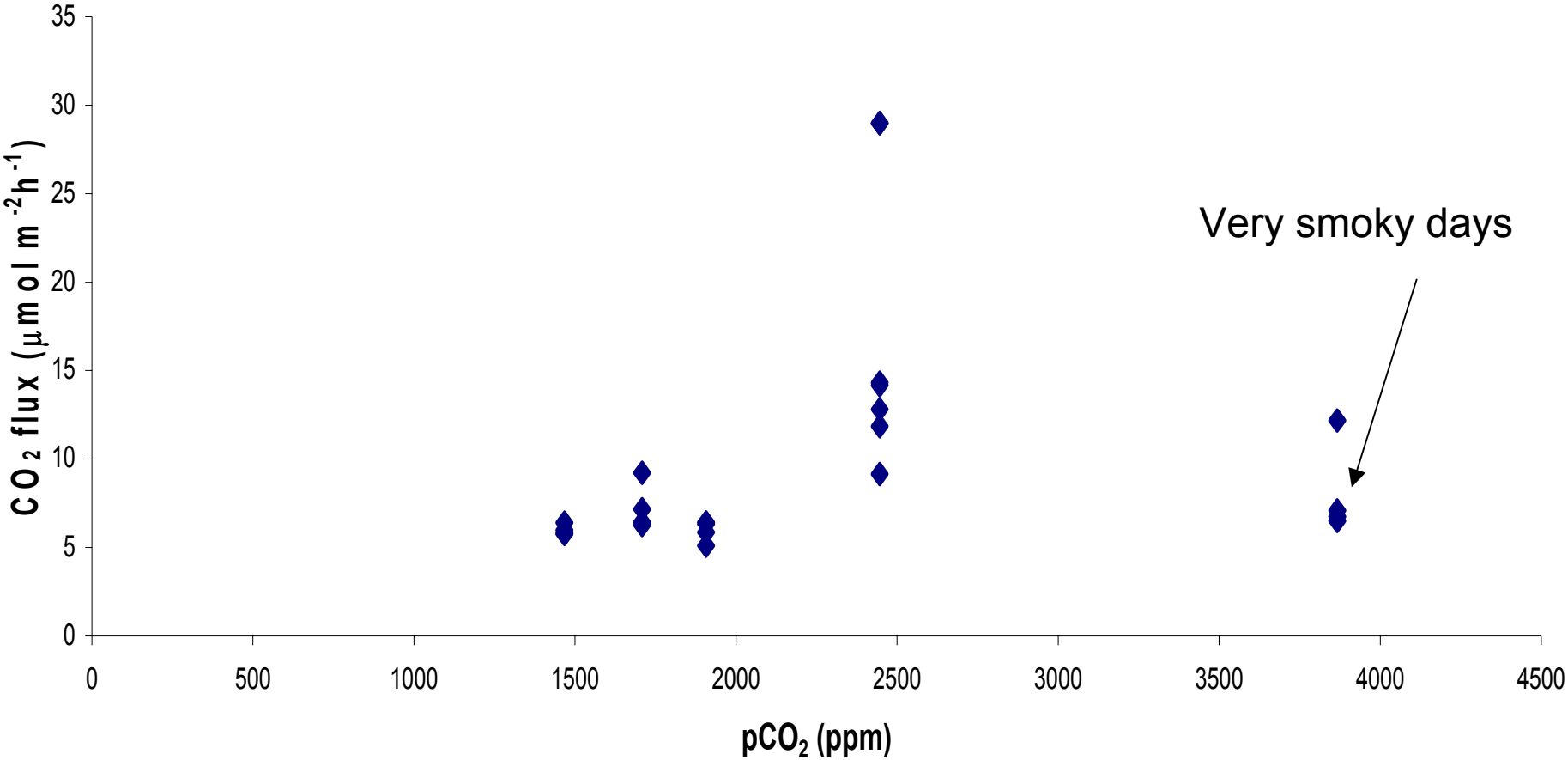
Relate fluxes with pH - WestAmaz



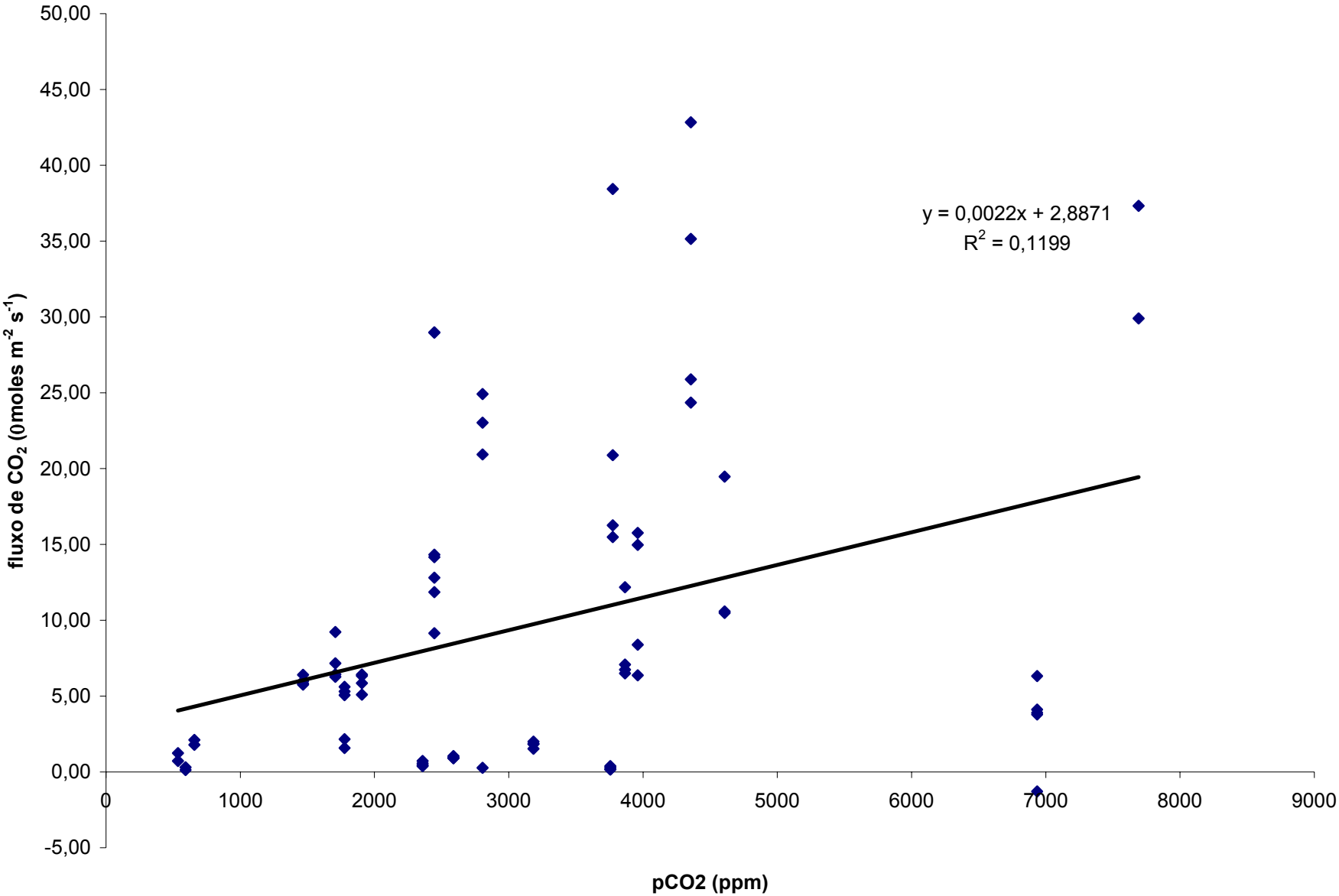
Relate fluxes with pH – whole Amaz



Relate fluxes with pCO_2 – West Amaz



Relate fluxes with pCO_2 – whole Amaz



Other parameters that could explain flux variability

- Turbulence / boundary layer thickness
- Channel depth
- Dissolved oxygen
- Suggestions?

How does anthropogenic pressure alter these fluxes??

- Higher atmospheric [CO_2]
- Higher sediments imput to rivers
  - More DOC adsorbed to sediments???
- Land cover change – NPP change?
  - How much goes into the rivers?
- DOC and DIC change?

What are next steps?

- Continue data collection (pCO_2, DIC, chemistry)
- Estimate rivers surface areas
- Scale up fluxes
- Seasonal Carbon isotope analysis