

# Témoignages et retours d'expérience

## Projet ERC – Synergie Imbalance P

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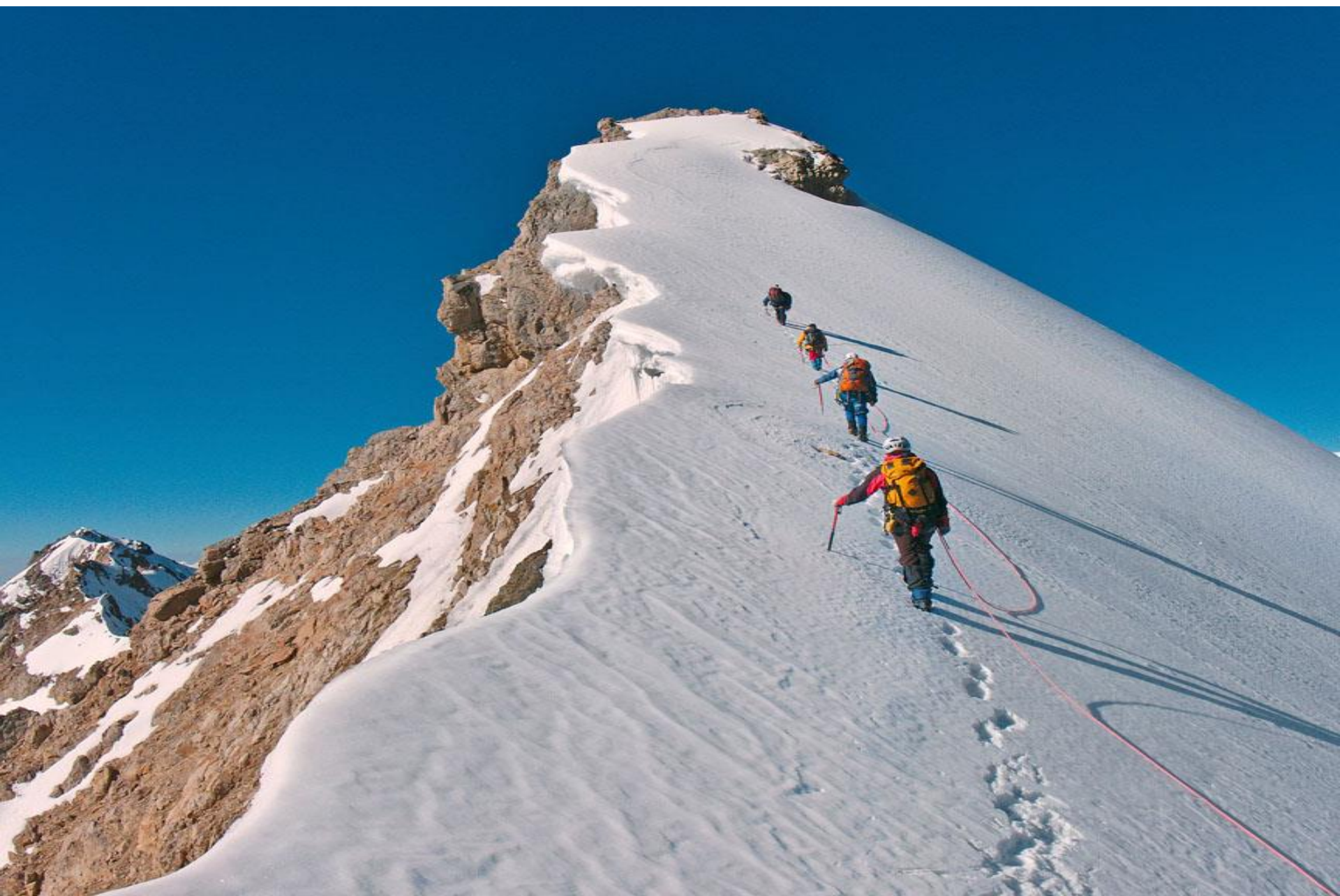
# P Imbalance

ERC Synergy Grant 2013

Quantify the **responses of ecosystems and society** in a world increasingly rich in N and C but **limited in Phosphorus**

P.Ciais, I.Janssens, M.Obersteiner, J.Peñuelas

# Difficultés possibles pour la proposition écrite



# Remarques - oral



# The phosphorus imbalance in Nature

Phosphorus **supply**  
to natural ecosystems  
**is limited**

- Ash and dust deposition
- Free-up inaccessible soil P
- Weathering of mineral P

**All small & uncertain processes**

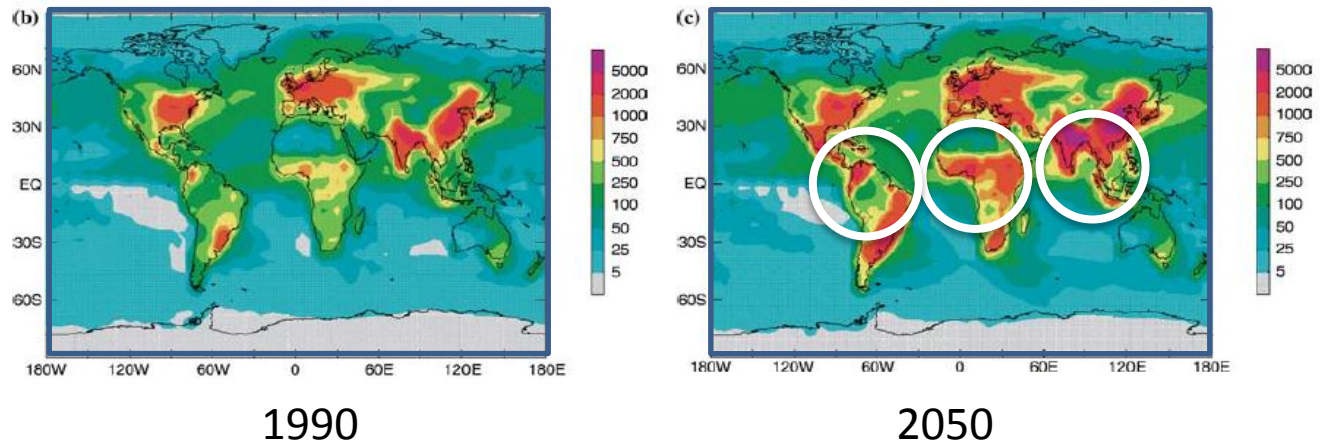
Phosphorus **demand**  
**is growing** due to  
human activities

- **Increasing CO<sub>2</sub>**, global effect
- **Increasing N** deposition, mainly over industrialized regions
- **Climate change**, e.g. longer growing seasons in boreal areas



# The phosphorus imbalance in tropical areas

- During the 21<sup>st</sup> century:
  - N deposition will continue, but slow down, over northern areas.
  - N deposition will **increase dramatically over tropical areas.**



- This will cause the N to P deposition ratio to increase.
- Unlike northern ecosystems, most **tropical forests** are more limited by P than by N.

# The phosphorus imbalance in tropical areas

- During the 21<sup>st</sup> century:
  - N deposition will continue, but slow down, over northern areas.
  - N deposition will **increase dramatically over tropical areas.**

**There exist no measurement of the phosphorus imbalance of tropical forests and its consequences**

- This will cause the N to P deposition ratio to increase.
- Unlike northern ecosystems, most **tropical forests** are more limited by P than by N.

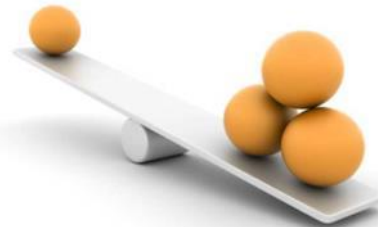
# The phosphorus imbalance in Agriculture

Phosphorus **supply** to agriculture **is limited** by mineable reserves

- P for fertilizers is a finite resource
- This resource is not evenly distributed
- Security of access

Phosphorus **demand** by agriculture **is growing**

- P fertilizers are needed to achieve high crop yields
- Growing population requires higher P-fertilizer inputs





# The phosphorus imbalance in Agriculture

Phosphorus **supply**  
to agriculture **is limited**  
by mineable reserves

Phosphorus **demand**  
by agriculture **is**  
**growing**

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**Limited supply of P-fertilizers will  
increase arable land area, causing  
deforestation and climate change**

# Existing Synergies

BARCELONA



ANTWERP

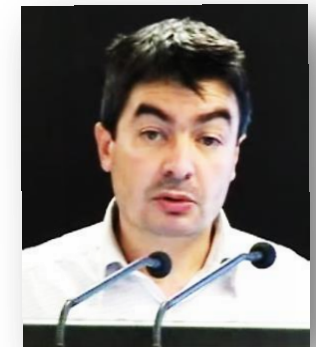


**Joint PhD student:** Marcos Fernandez

## Initial joint work on phosphorus

- Penuelas et al. *Nature Communications* 2013. in press
- Obersteiner et al. *Nature Geoscience* 2013, 6, 897
- Van Velde et al. *Glob Change Biology* 2013. in press

**Joint PhD student:** Marta Camino



# Necessary Synergies

BARCELONA

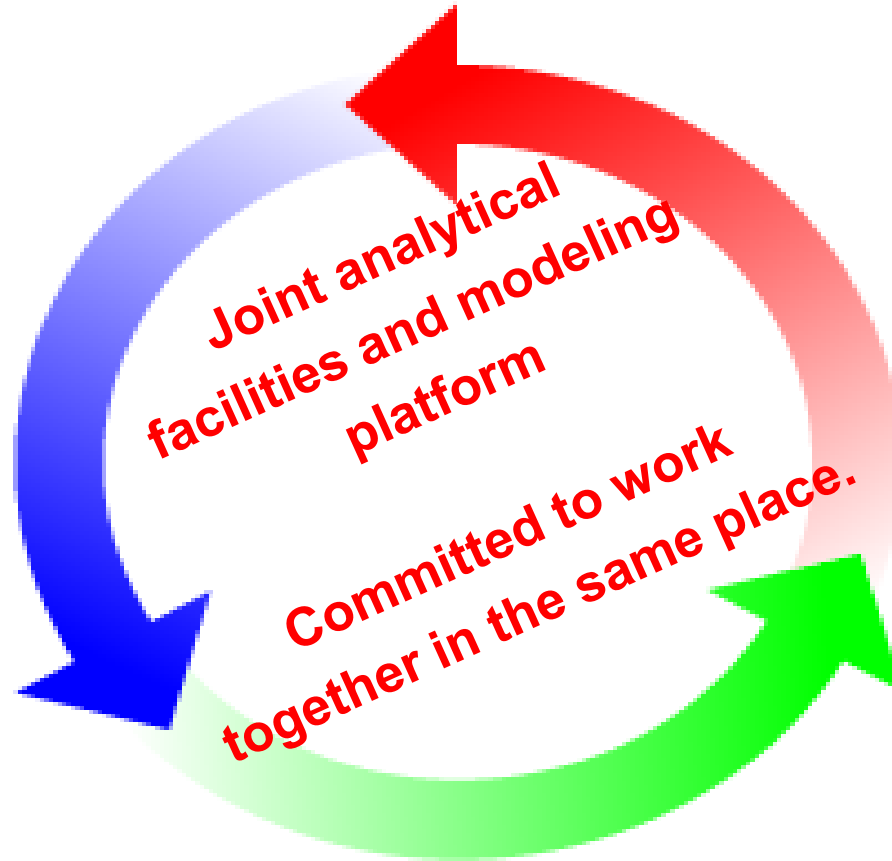


Integrating  
academic  
disciplines  
nature & socio-  
economy



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Combining theory with  
empirical work

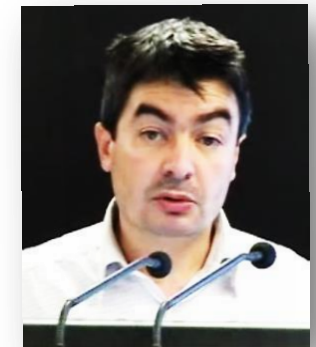


Crossing spatial &  
temporal scales

ANTWERP



Integrating  
biogeochemical  
cycles



PARIS

# Gérer l'après

“Je vous le dis encore, il est plus facile à un chameau de passer par le trou d'une aiguille qu'à un riche d'entrer dans le royaume de Dieu.”



# Conclusion

*Les vieillards aiment à donner de bons préceptes, pour se consoler de n'être plus en état de donner de mauvais exemples*

LA ROCHEFOUCAULD, Max. 93