Vegetation response of High Andean Wetlands and surrounding land covers to precipitation in semi-arid mountain region of southern Peru

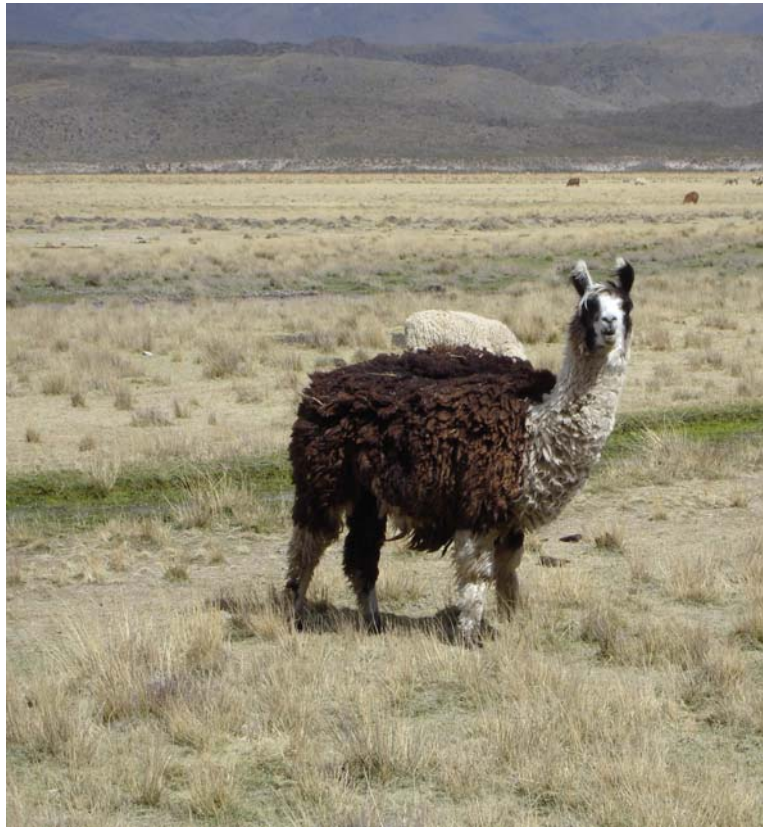
Marco Otto, Jochen Richters and Dieter Scherer

Technische Universität Berlin (Germany)
Department of Climatology

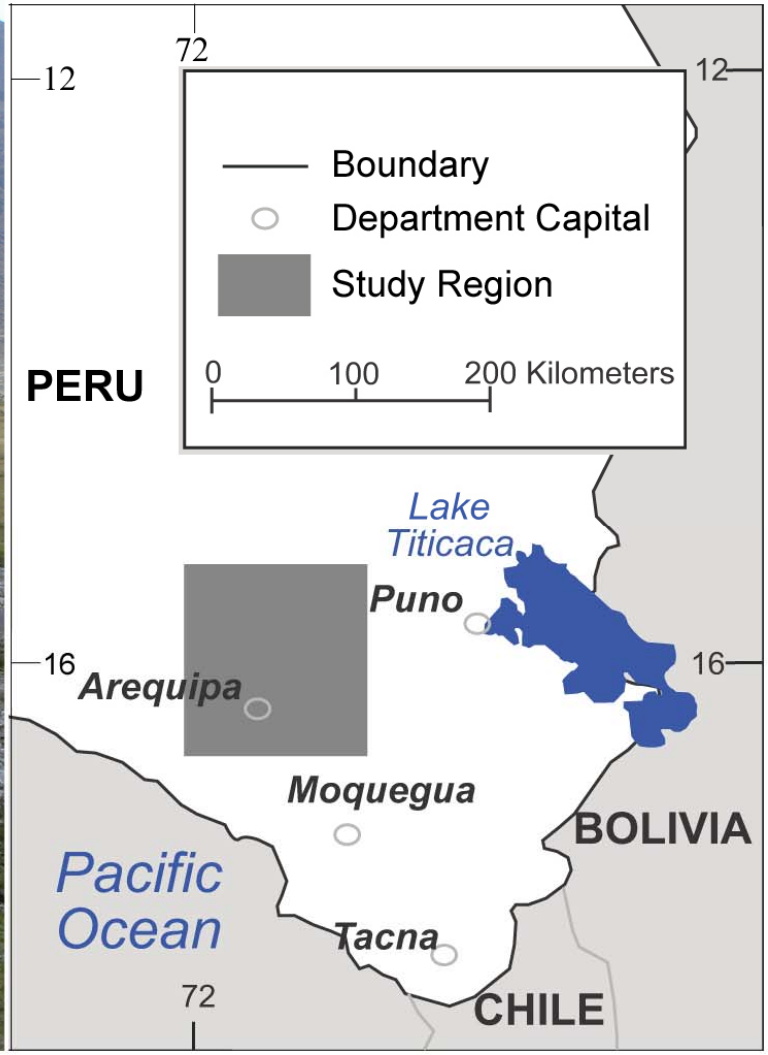
Marco.Otto@Klima.TU-Berlin.de

Outline

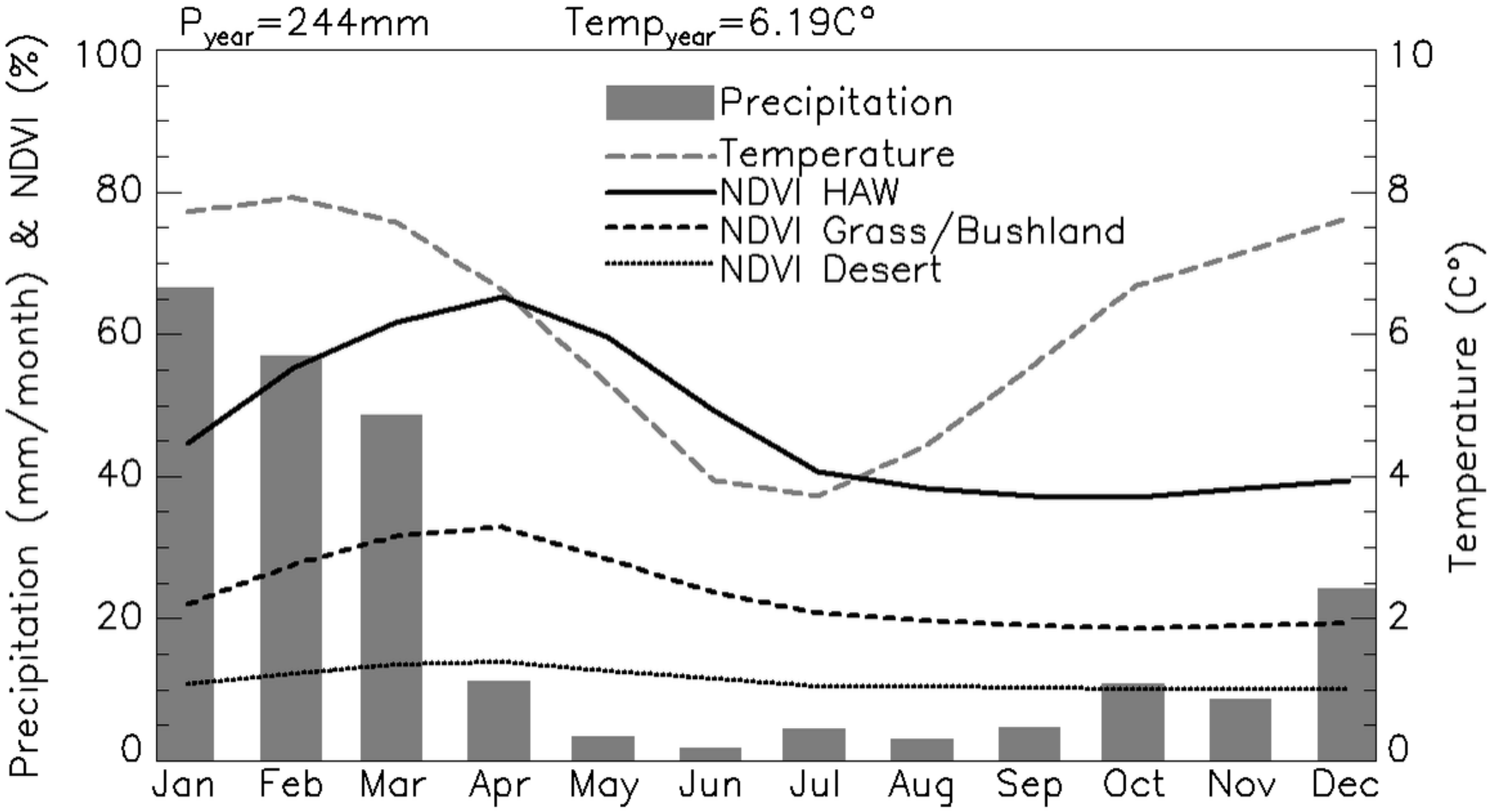
- Introduction
- Methods and Data
- Results
- Conclusion



Introduction – Study Area

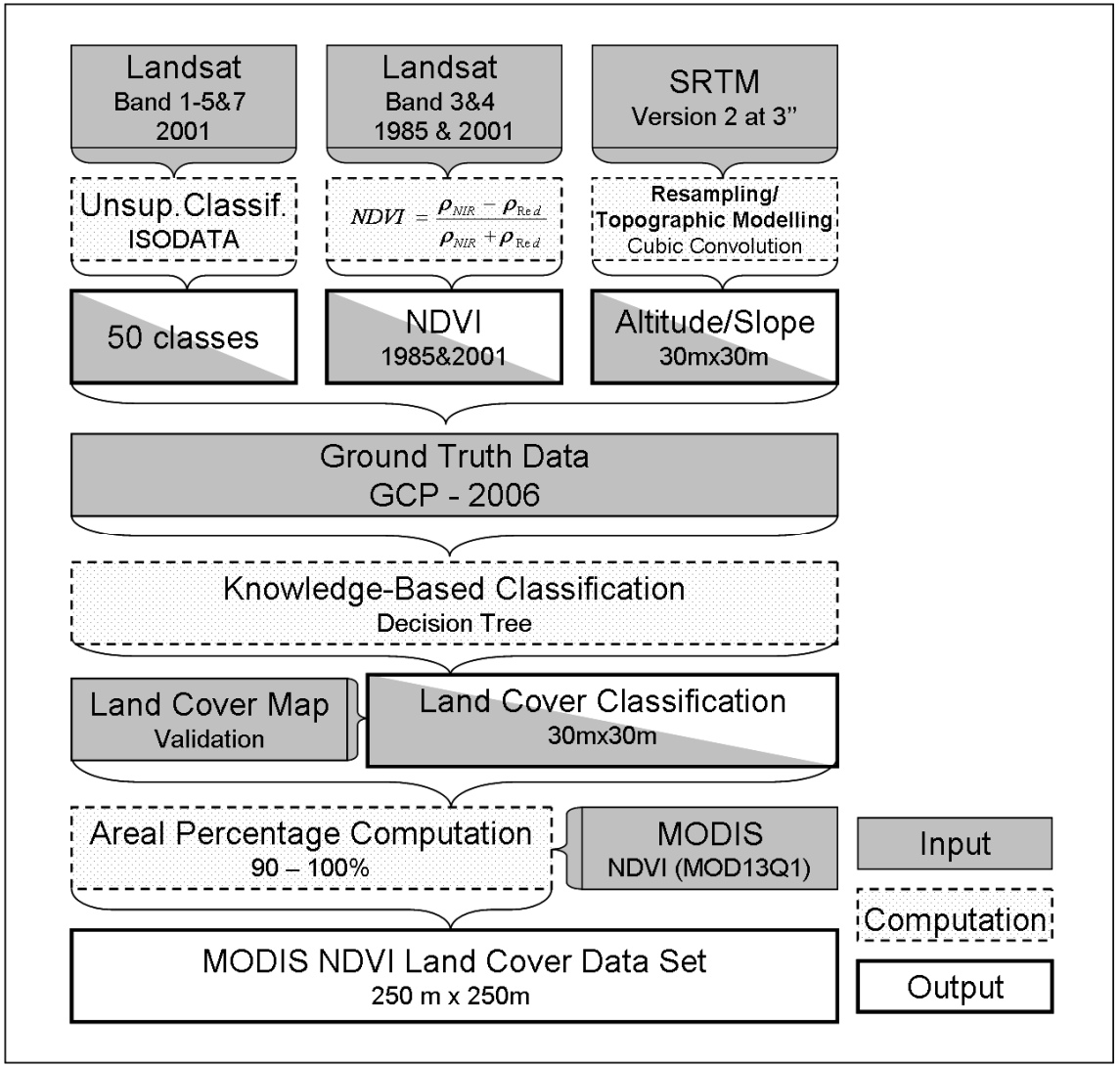


Introduction – Study Area

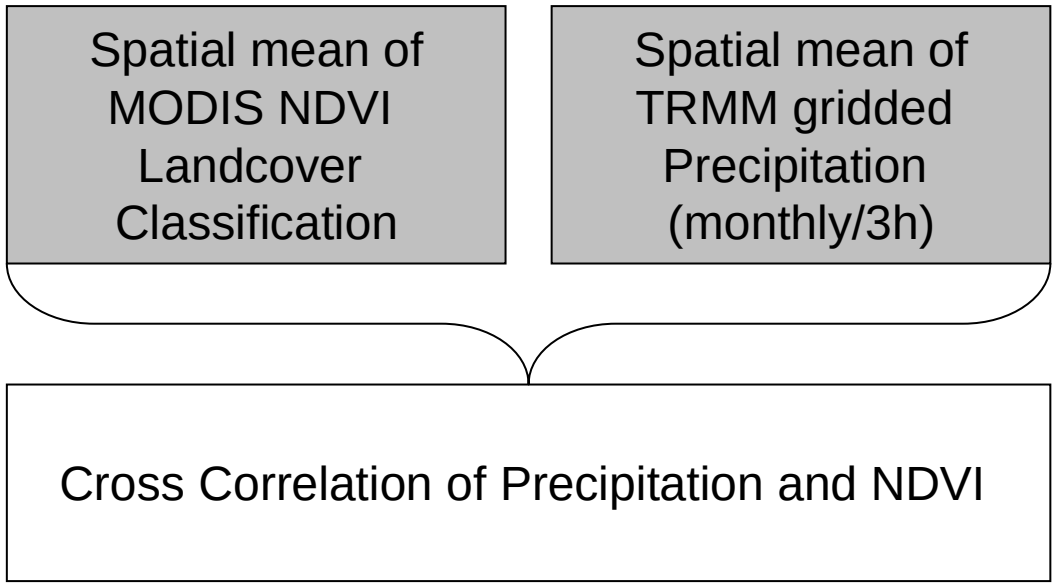


Precipitation data from: Matsuura, K. & Cort, J. W. (2007)

Methods and Data - Classification



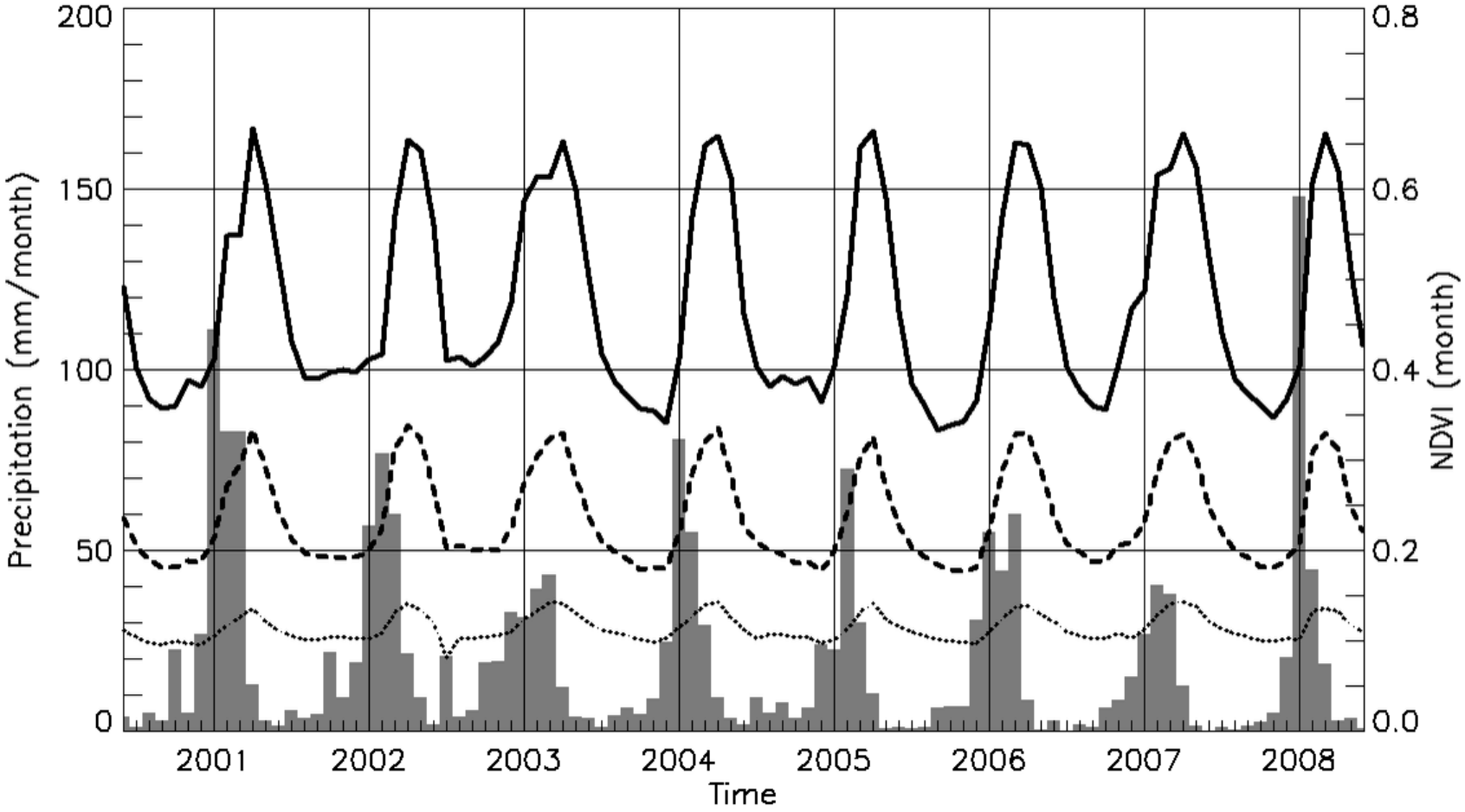
Methods and Data – Temporal Analysis



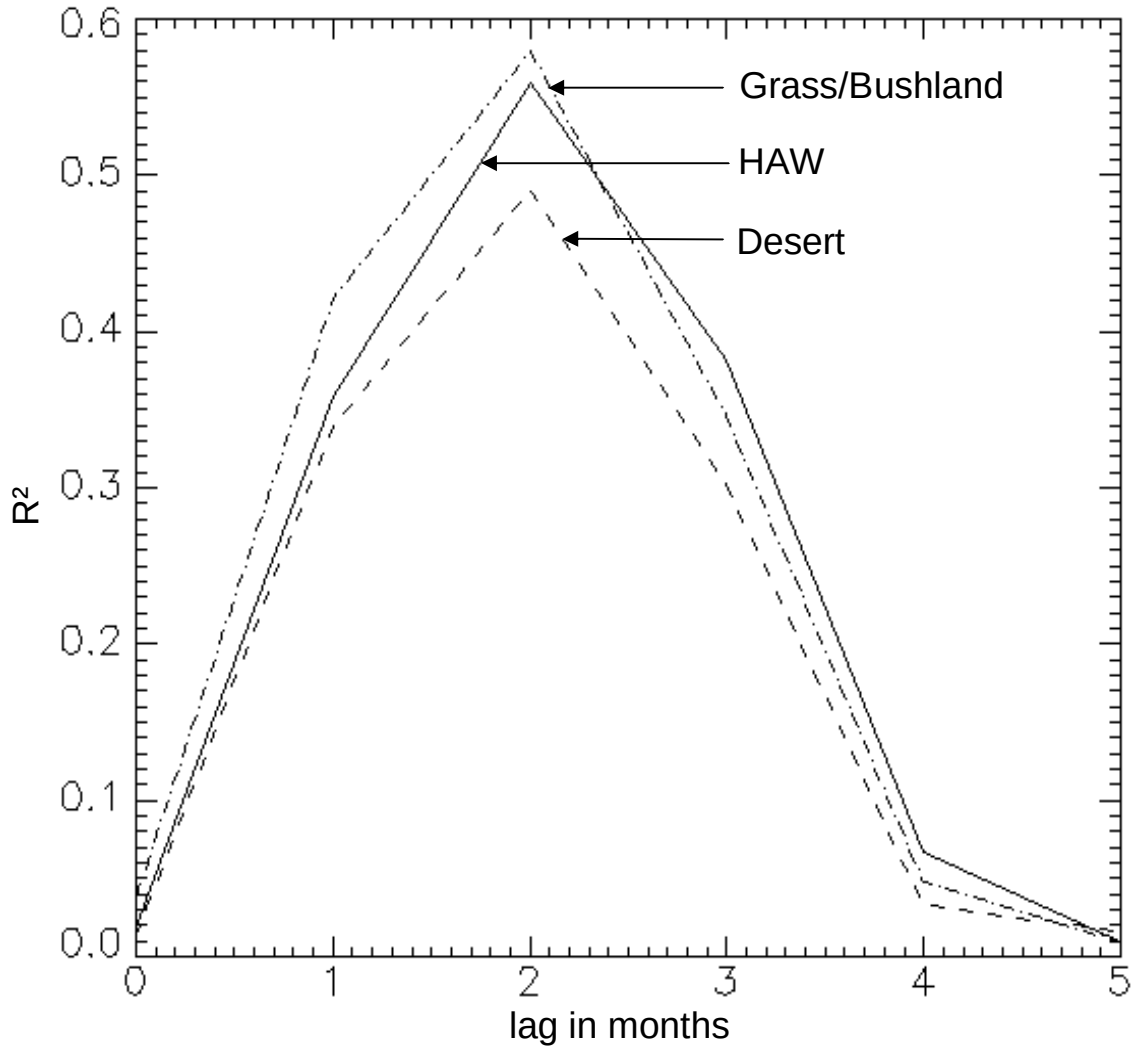
Results

	grass/bushland	desert	HAW	anthropog. areas	snow/ glacier	lakes
Area, km²	***8180***	***7050***	***666***	***281***	***210***	***126***
Proportion, %	***49.5***	***42.7***	***4.0***	***1.7***	***1.3***	***0.8***

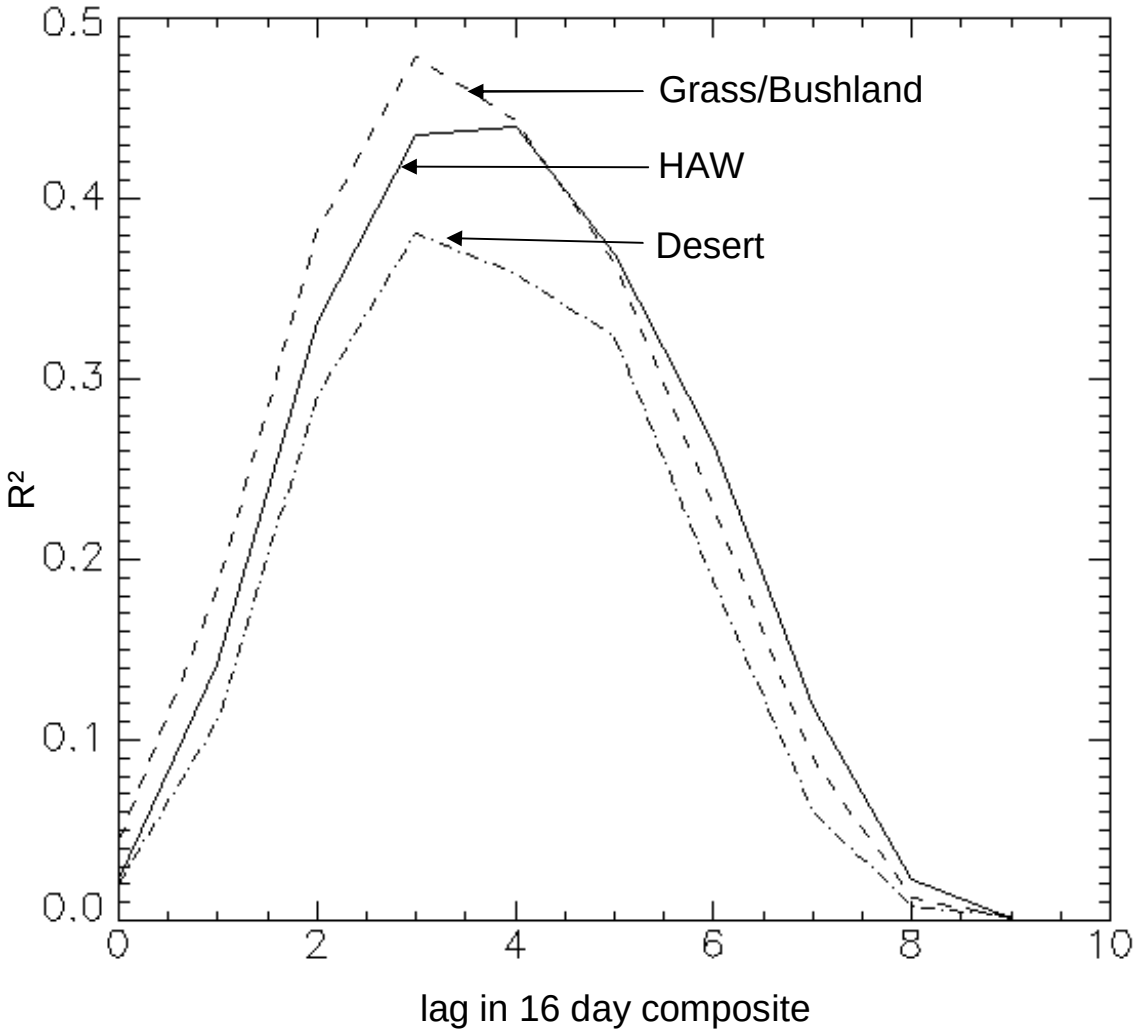
Results


200
150
100
50
0
Precipitation (mm/month)
0.8
0.6
0.4
0.2
0.0
NDVI (month)
2001
2002
2003
2004
2005
2006
2007
2008
Time

Results – Monthly Time Scale



Results – Sub-Monthly Time Scale

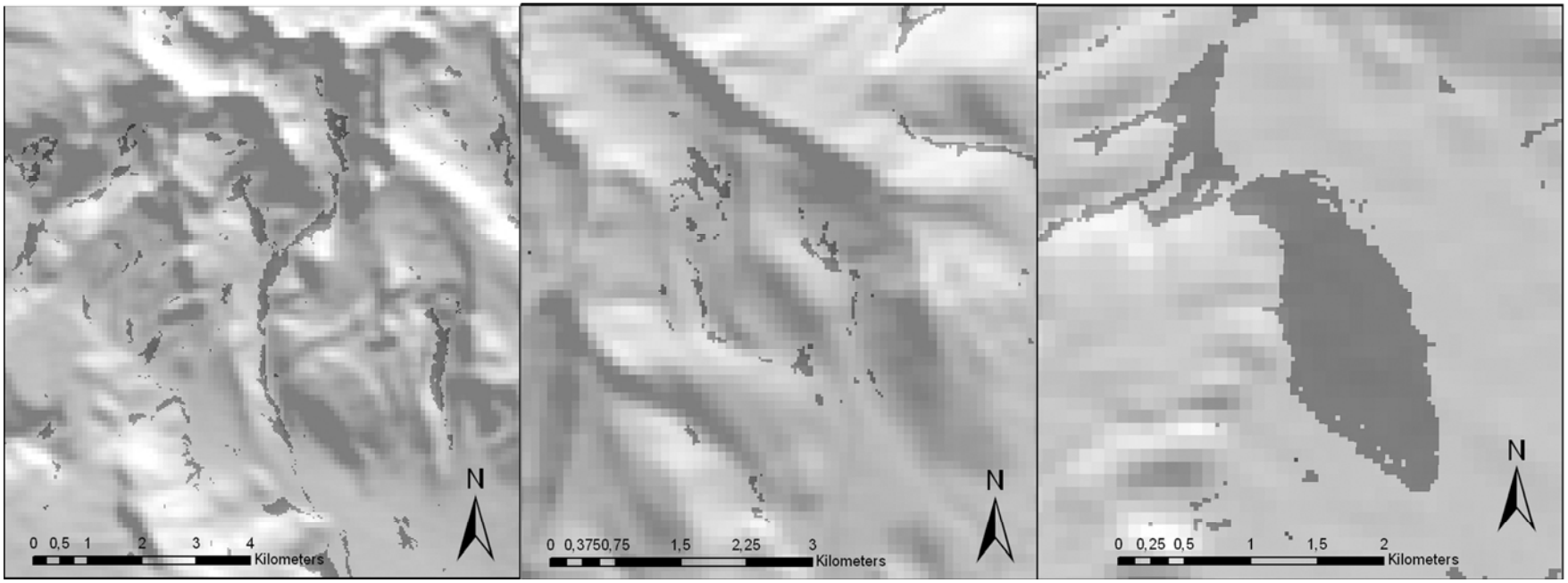


Results

sloping peatland

basin peatlands

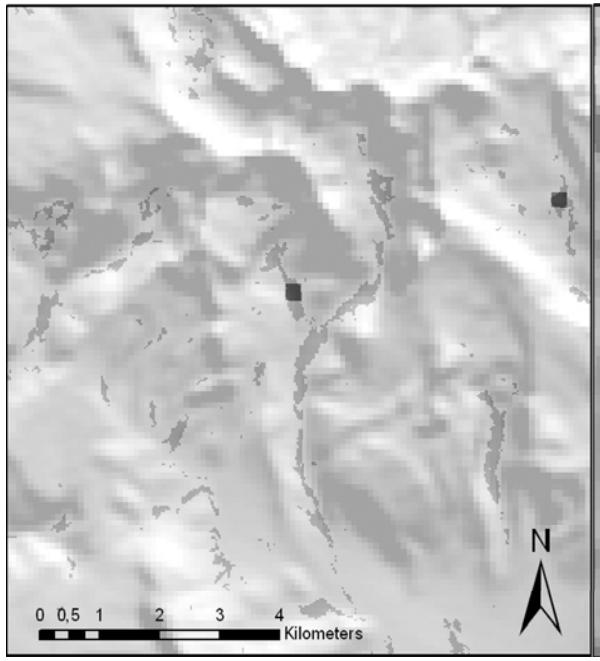
flat peatlands



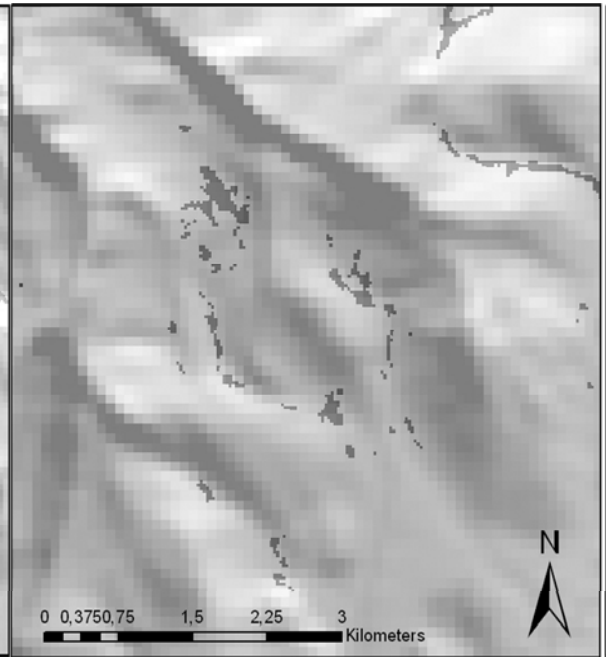
Squeo, F. A et al (2006), 'Bofedales: high altitude peatlands of the central Andes', *Revista Chilena de Historia Natural* 79(2), 245-255.

Results

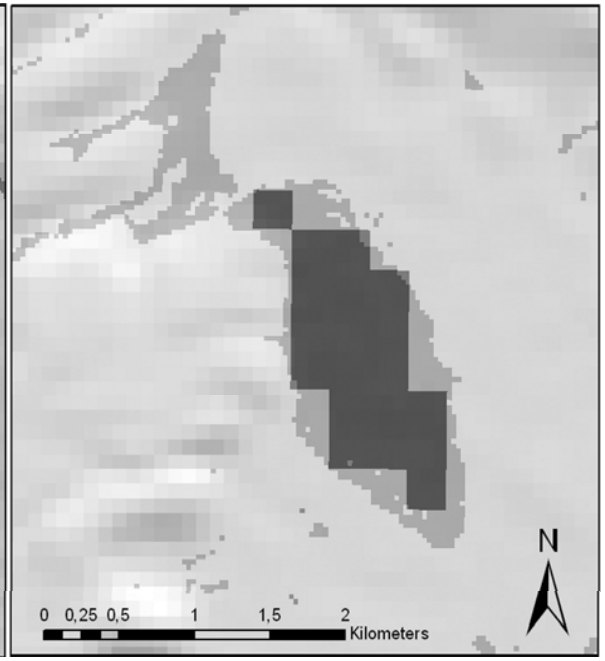
sloping peatland



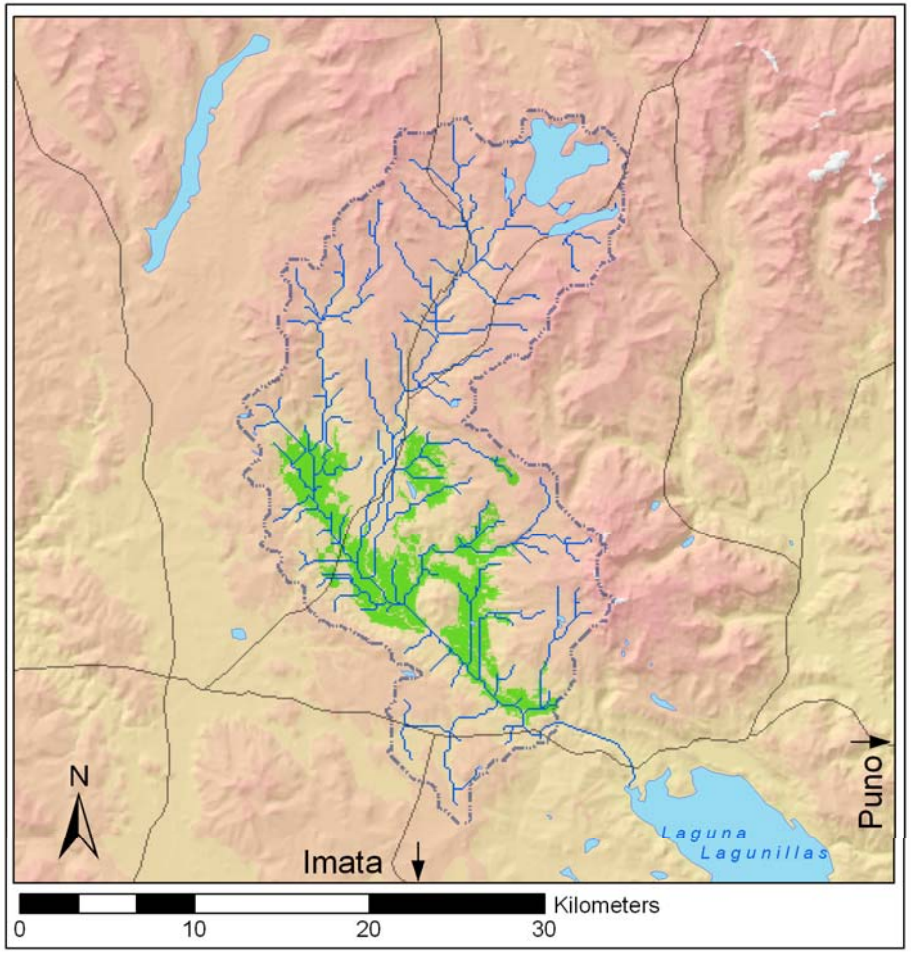
basin peatlands



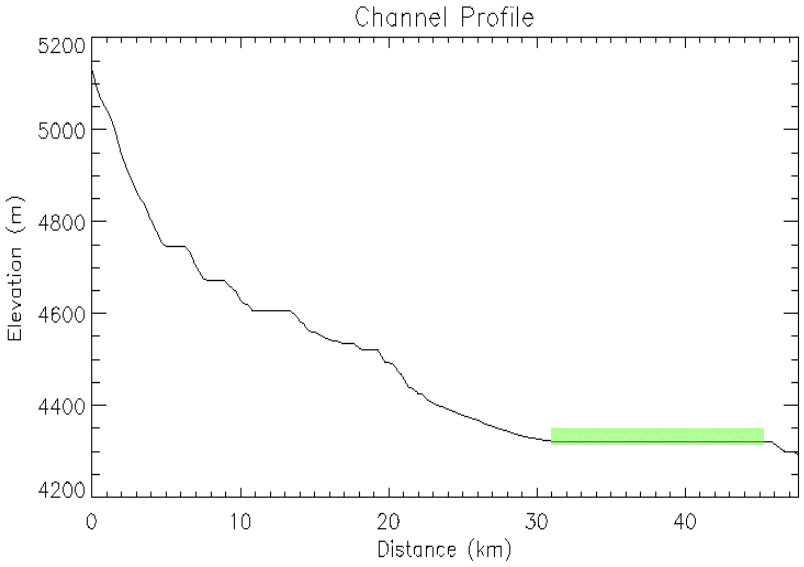
flat peatlands



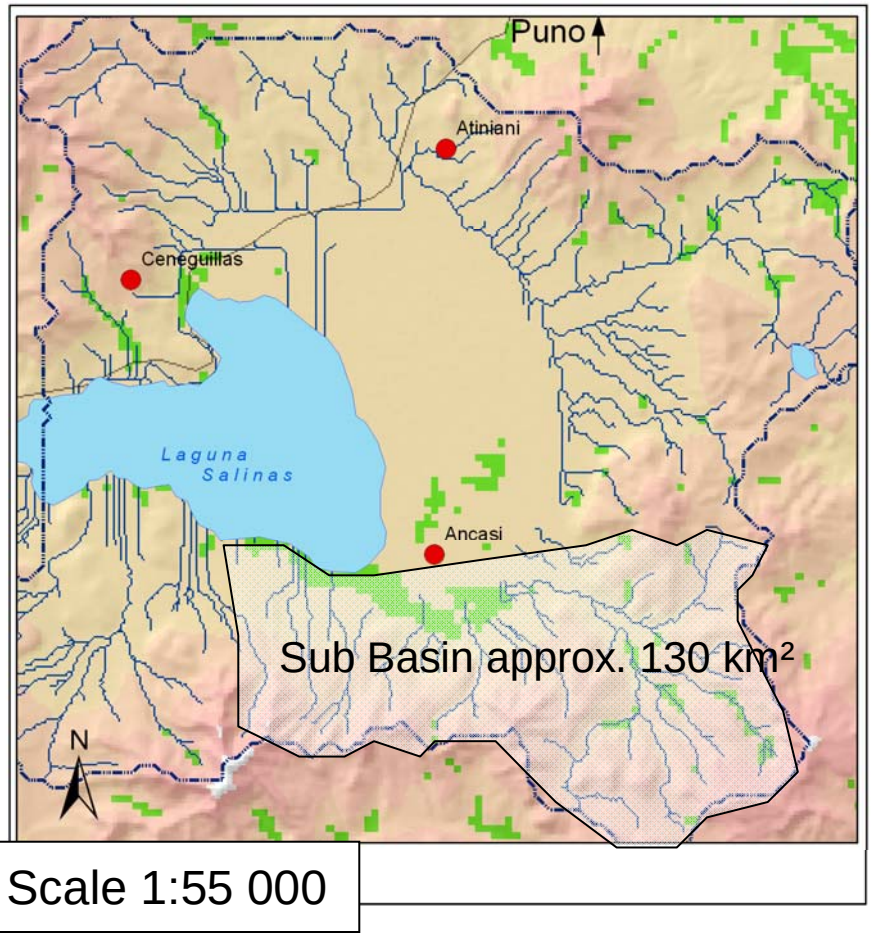
Lake Lagunillas



Basin area:	540.4 km²
Longest channel length:	50.3 km
HAW coverage	48.6 km²

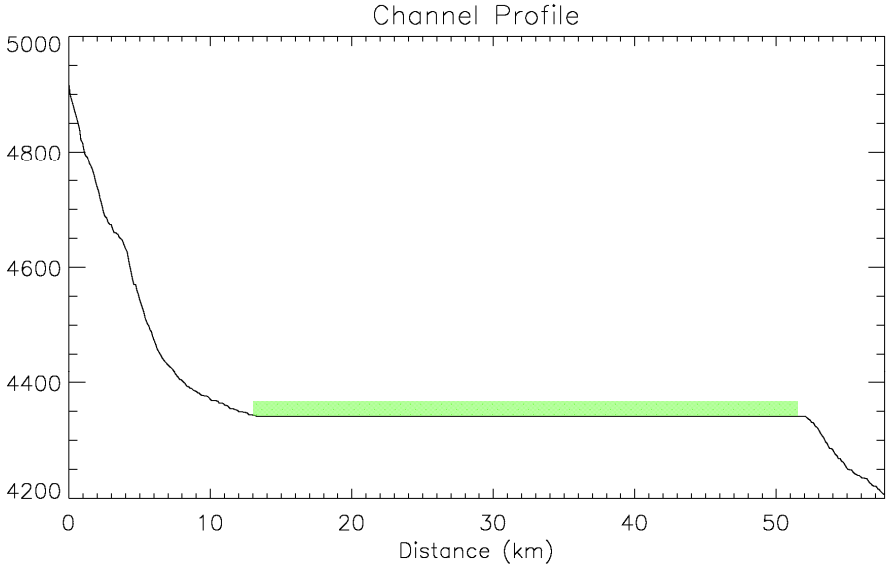


Lake Salinas

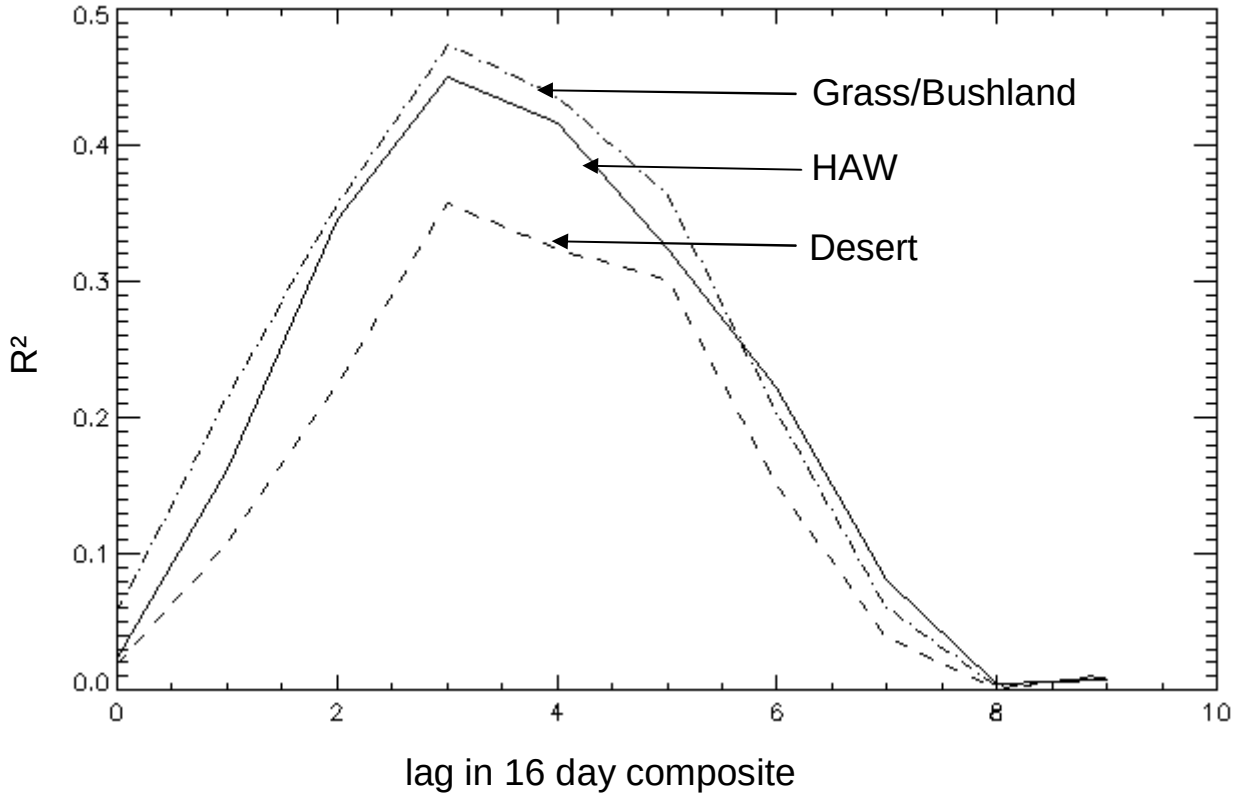


Scale 1:55 000

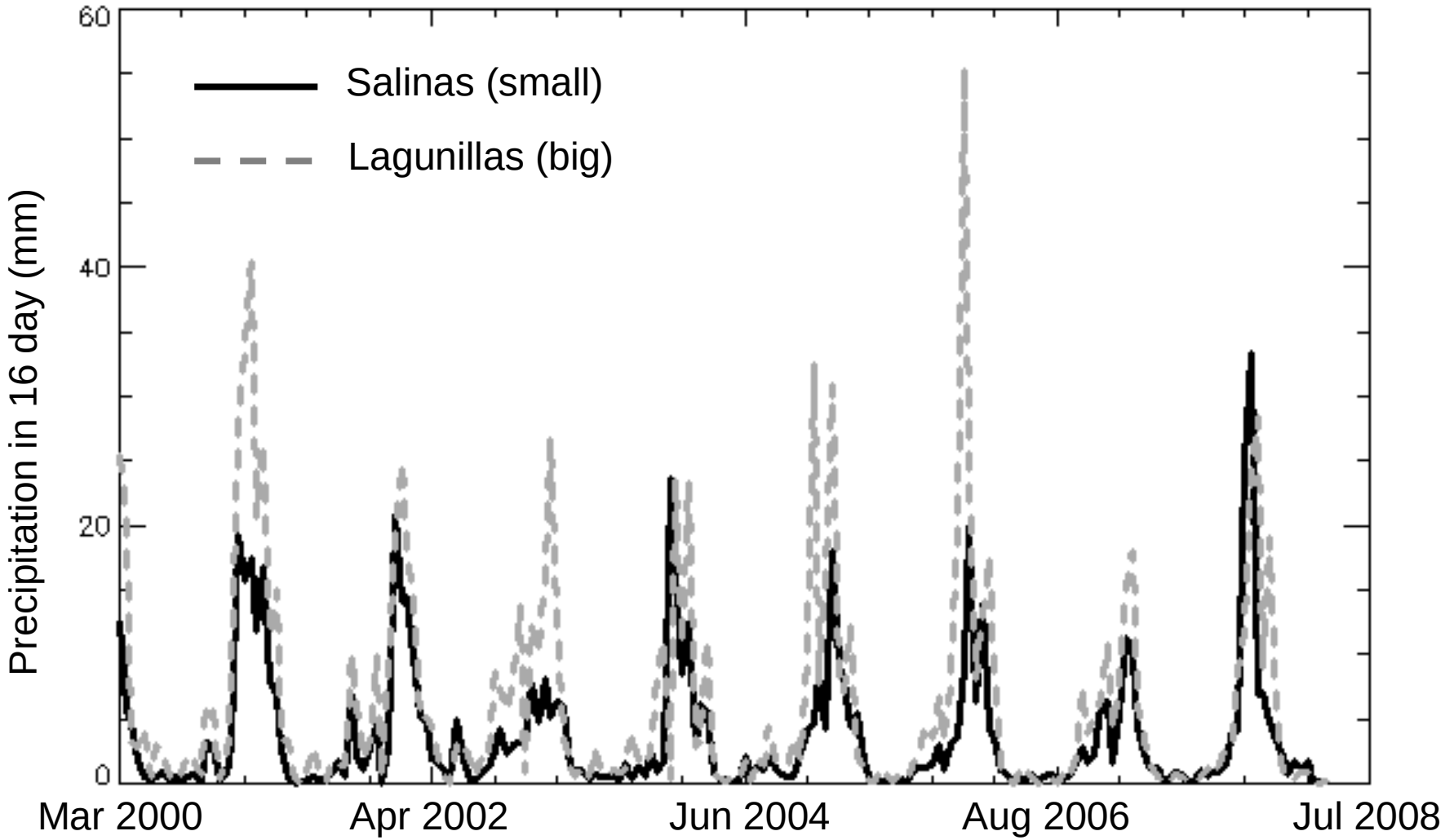
Basin area:	635 km²
Longest channel length:	50 km
HAW coverage	5 km²



Lake Salinas



Results


Salinas (small)
Lagunillas (big)
Precipitation in 16 day (mm)
60
40
20
0
Mar 2000
Apr 2002
Jun 2004
Aug 2006
Jul 2008

Conclusion

1. HAW are a type of land cover responding different to precipitation
   - Higher NDVI values but different time delayed response
   - “buffer effect”

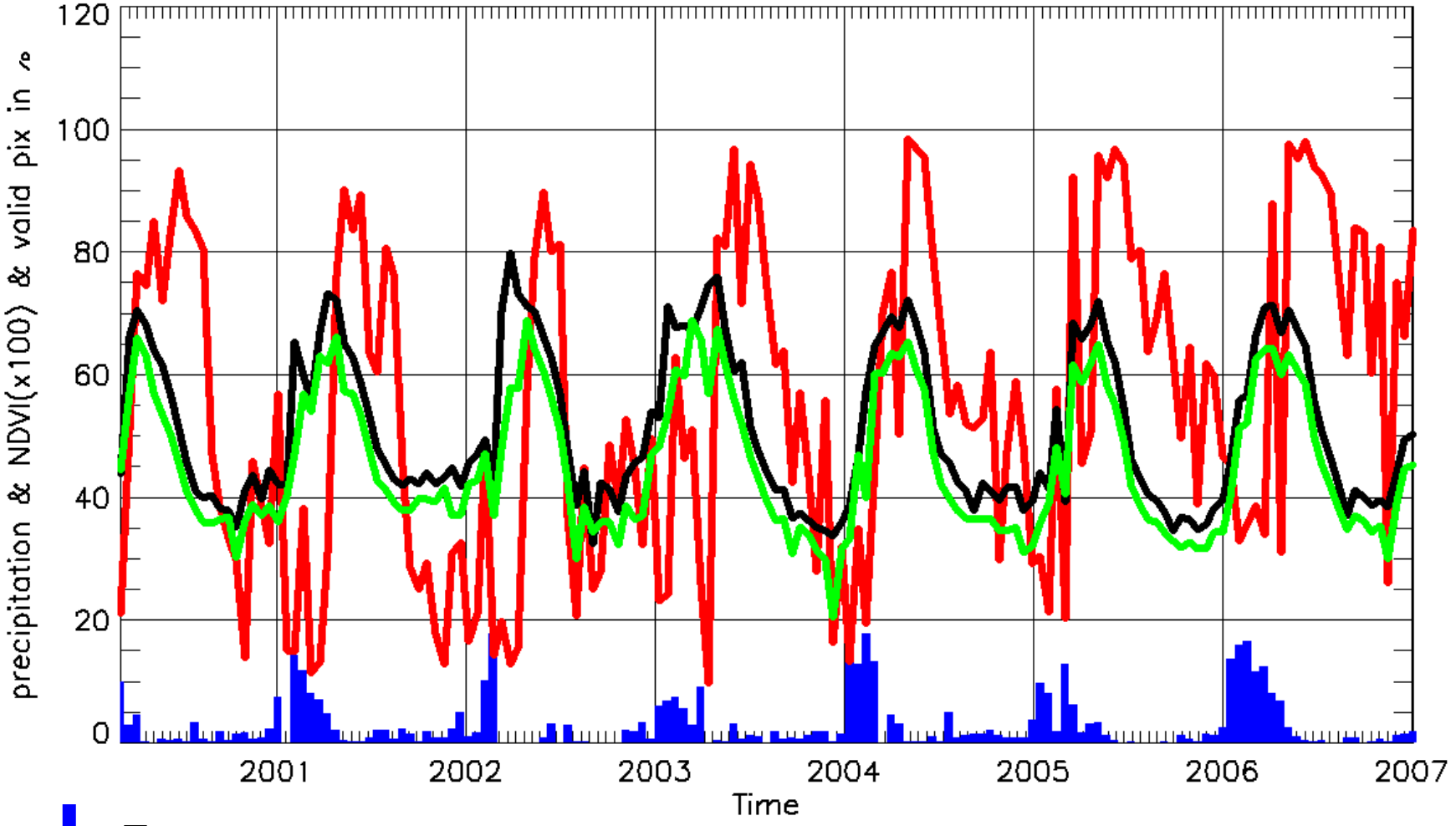
2. Modis (NDVI) and TRMM data are applicable for investigation at local scale (<25km²)
   - flat type of HAW are better represented
   - time lag of response is shifting the data to less cloud contaminated conditions

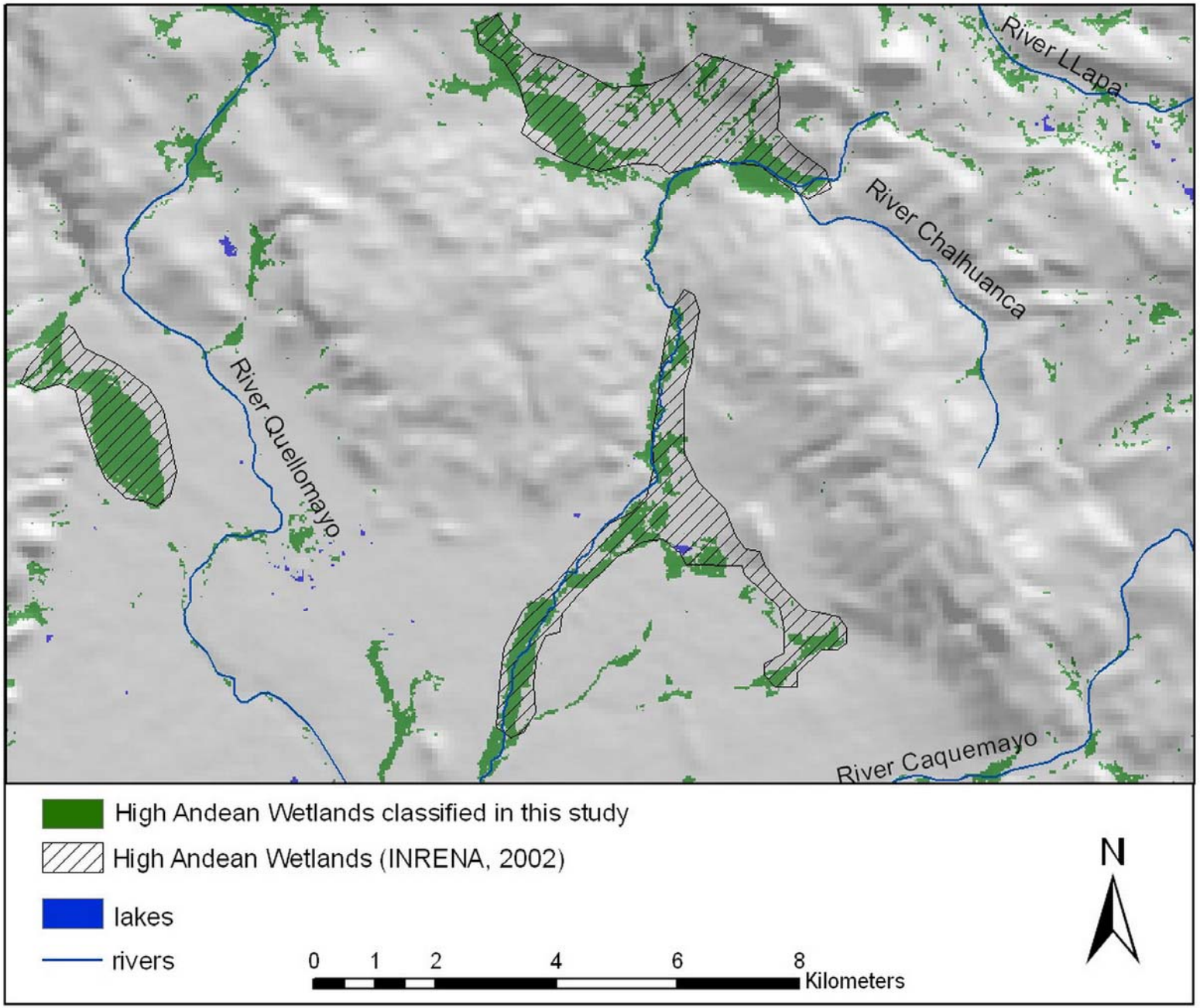
Questions

What over factors have an impact on HAW?

- hydrology (interflow)
- water storage (snow, glaciers, lakes)
- climate change
- anthropogenic influences

Thank You!


precipitation & NDVI(x100) & valid pix in %
120
100
80
60
40
20
0
2001
2002
2003
2004
2005
2006
2007
Time
Trmm
QA (%)
Spacial mean NDVI
Bofedales without QA (/100)
Spacial mean NDVI
Bofedales with QA (/100)


River LLapa
River Chalhuanca
River Quellomayo
River Caquemayo
High Andean Wetlands classified in this study
High Andean Wetlands (INRENA, 2002)
lakes
rivers
0 1 2 4 6 8
Kilometers
N