

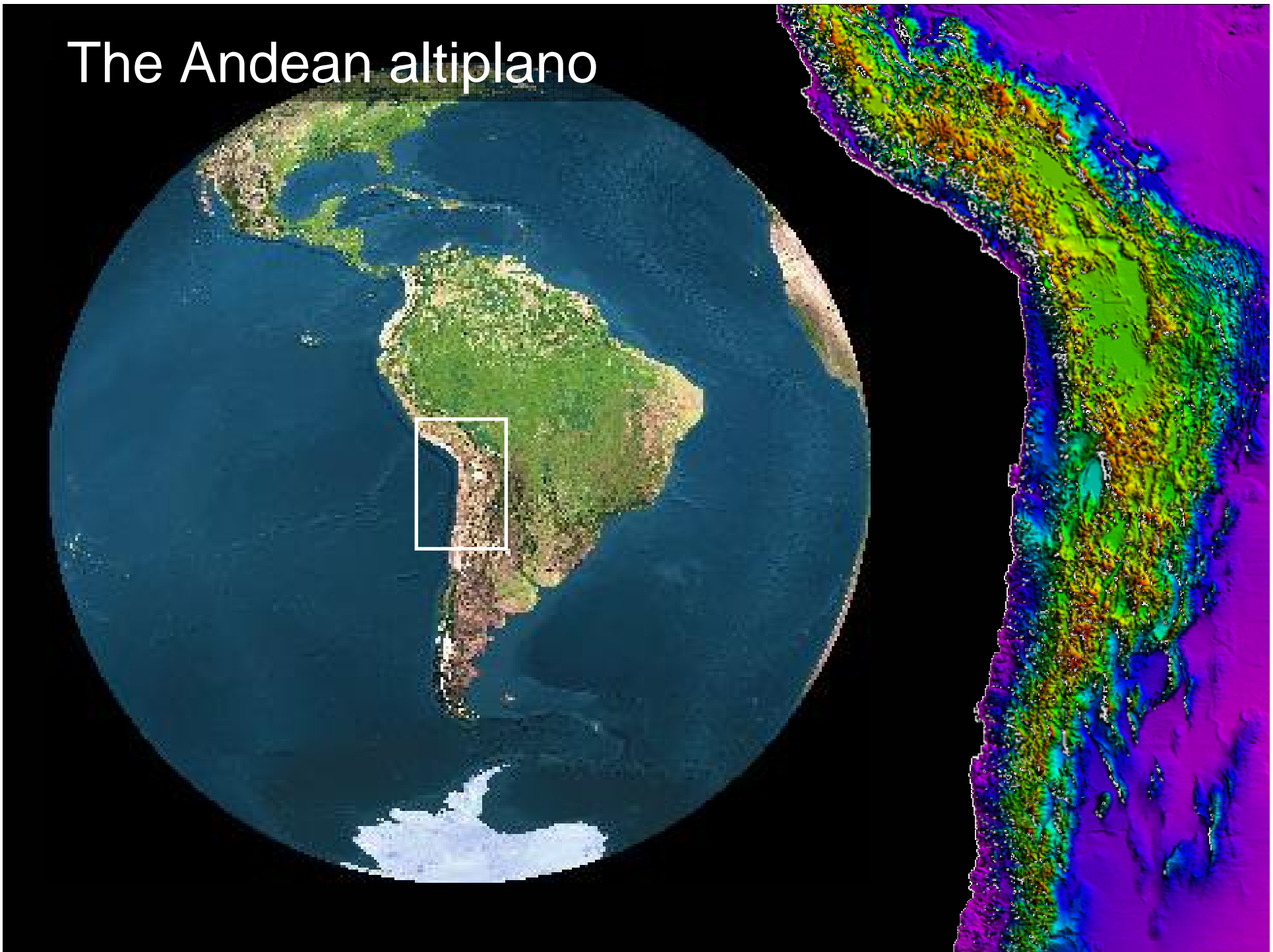


Evaluating the Influence of El Niño Southern Oscillation Climatic Cycles on Vicuña Habitat Quality in the Chilean Altiplano

Jerry Laker

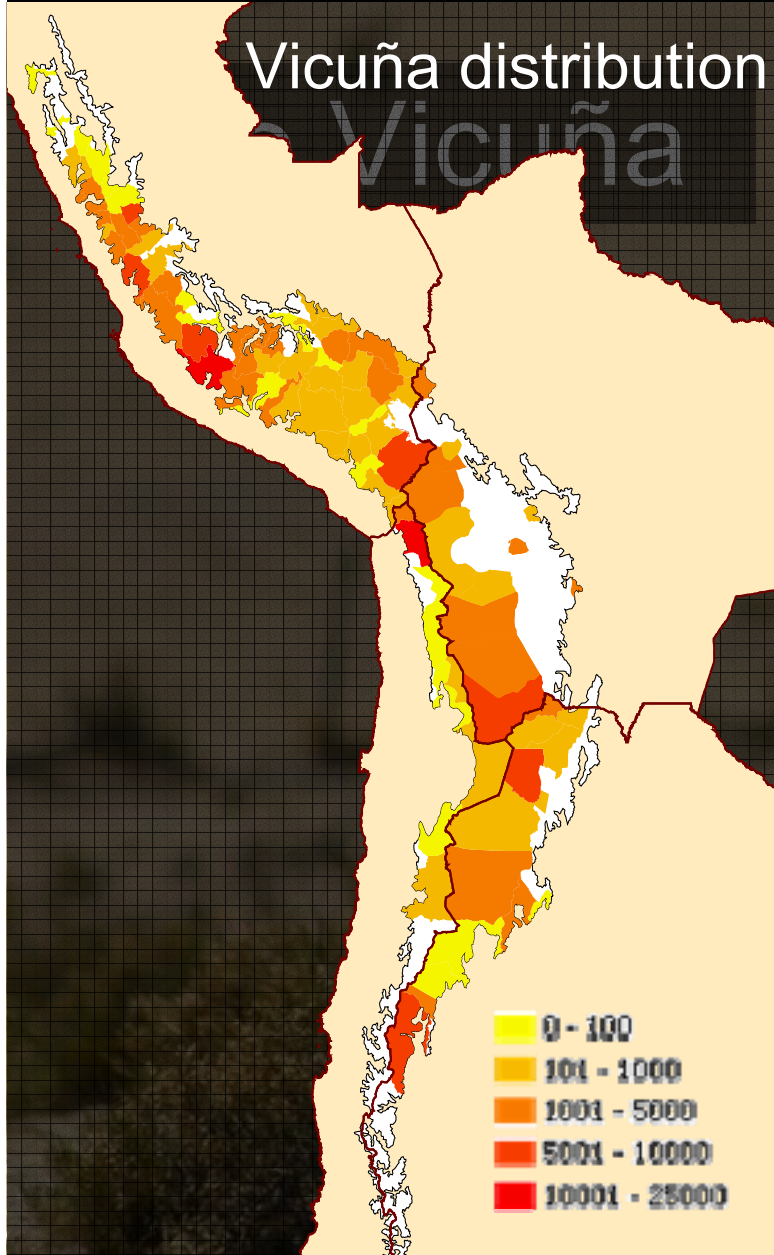
Jorge Herreros de Lartundo; Alejandra Muñoz; Cristian Bonacic; Iain Gordon.

The Andean altiplano



Vicuña distribution

Vicuña



Vicuñas are now used in capture–shearing–release programme for harvesting luxury textile fibre



The aim of this work is to understand the ecology of the vicuña, in relation to its environment and management

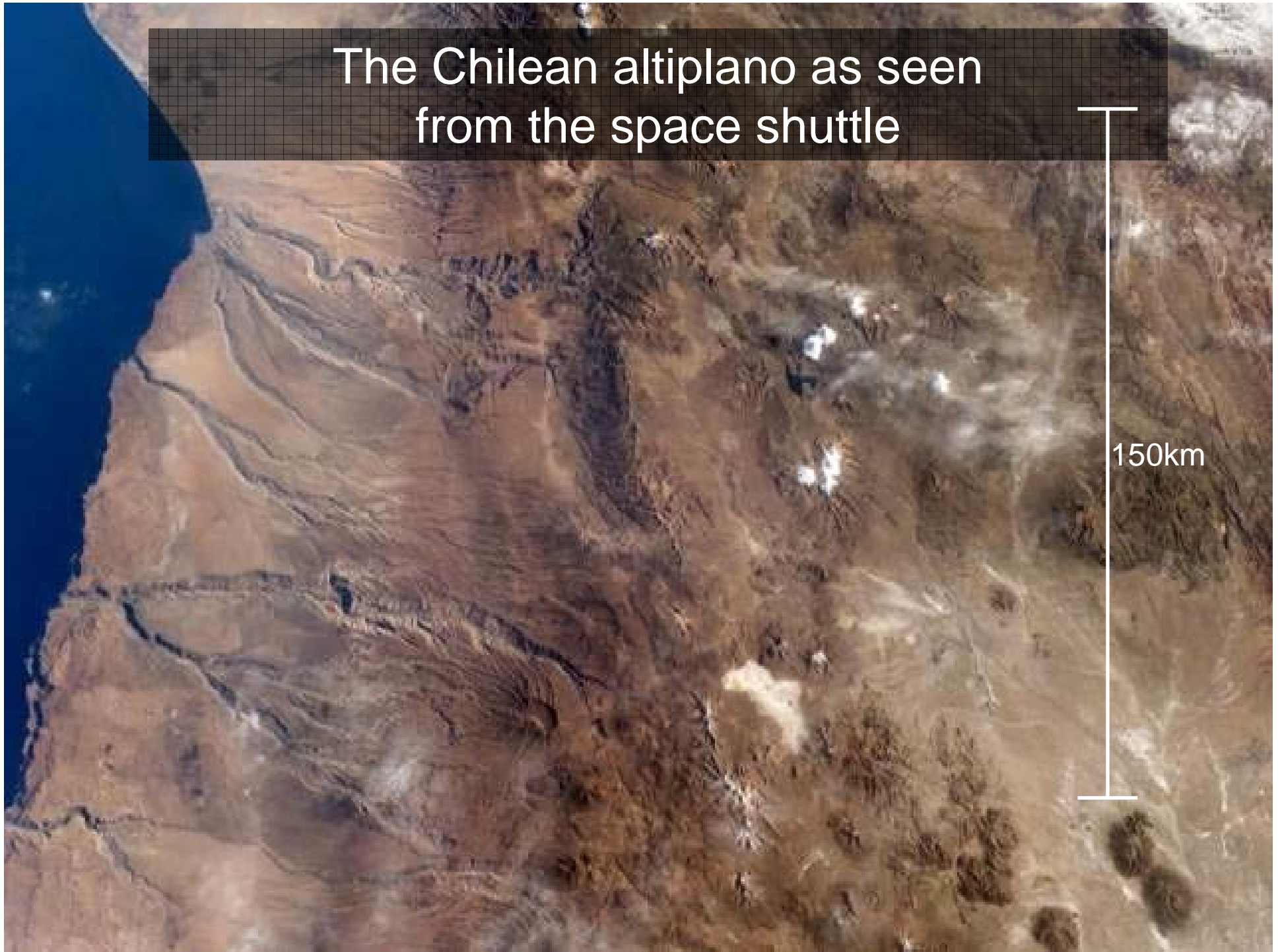


Altiplano

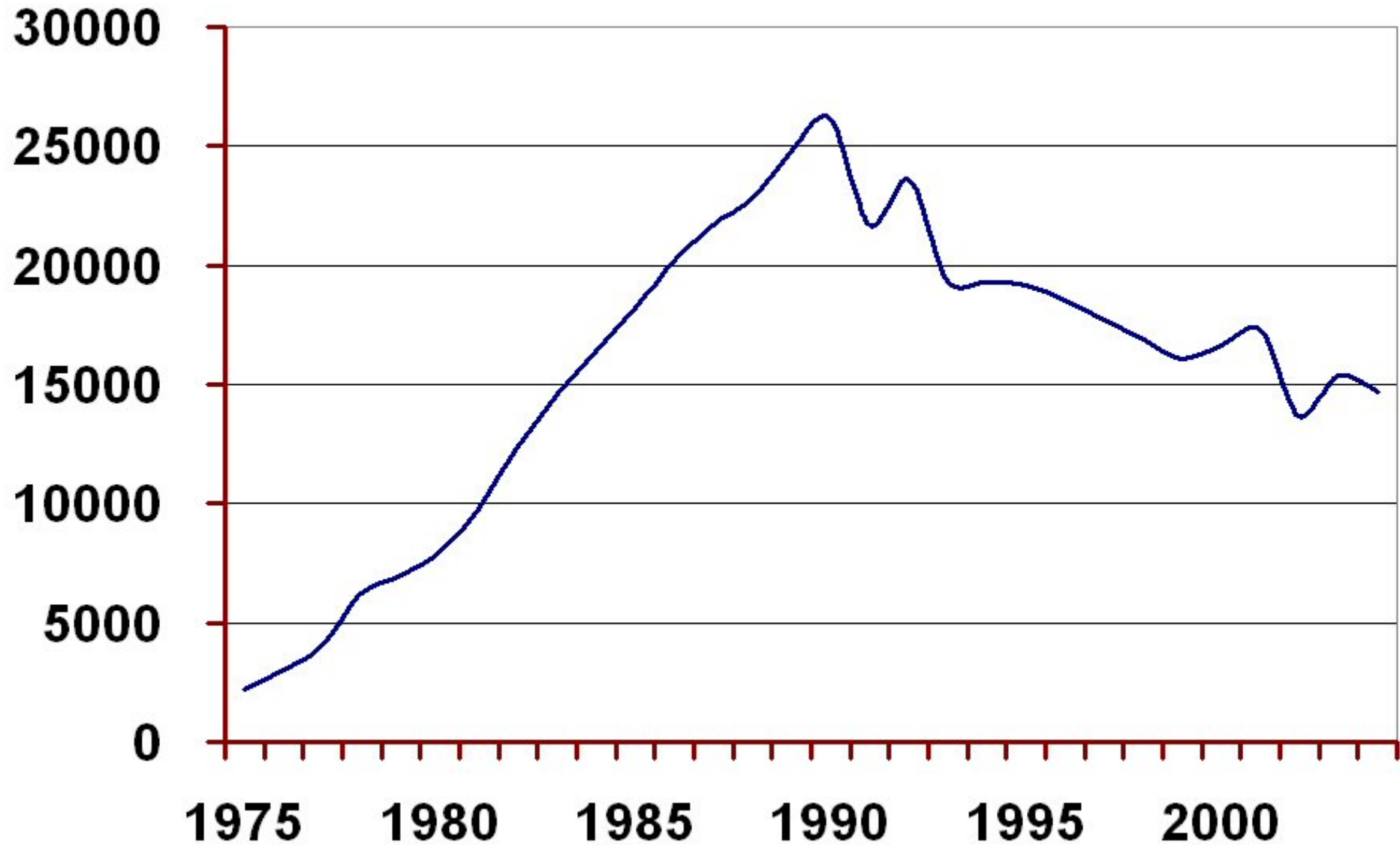


The Chilean altiplano as seen from the space shuttle

150km



Vicuña population in Chile, 1975-2004



Possible causes of decline

- Intra-specific competition
- Competition with livestock
- Hunting
- Inaccurate census methods
- Disease
- Changes in rangeland quality



Research question

What impact does climate have on vicuña populations in Chile ?

Why is that important?

- To interpret the census data
- To distinguish management induced population changes from natural cycles



Evaluate rangeland quality by remote sensing

1. Influence of Climatic Variability
on Vicuña Habitat Quality
2. Spatial distribution of vegetation
resources

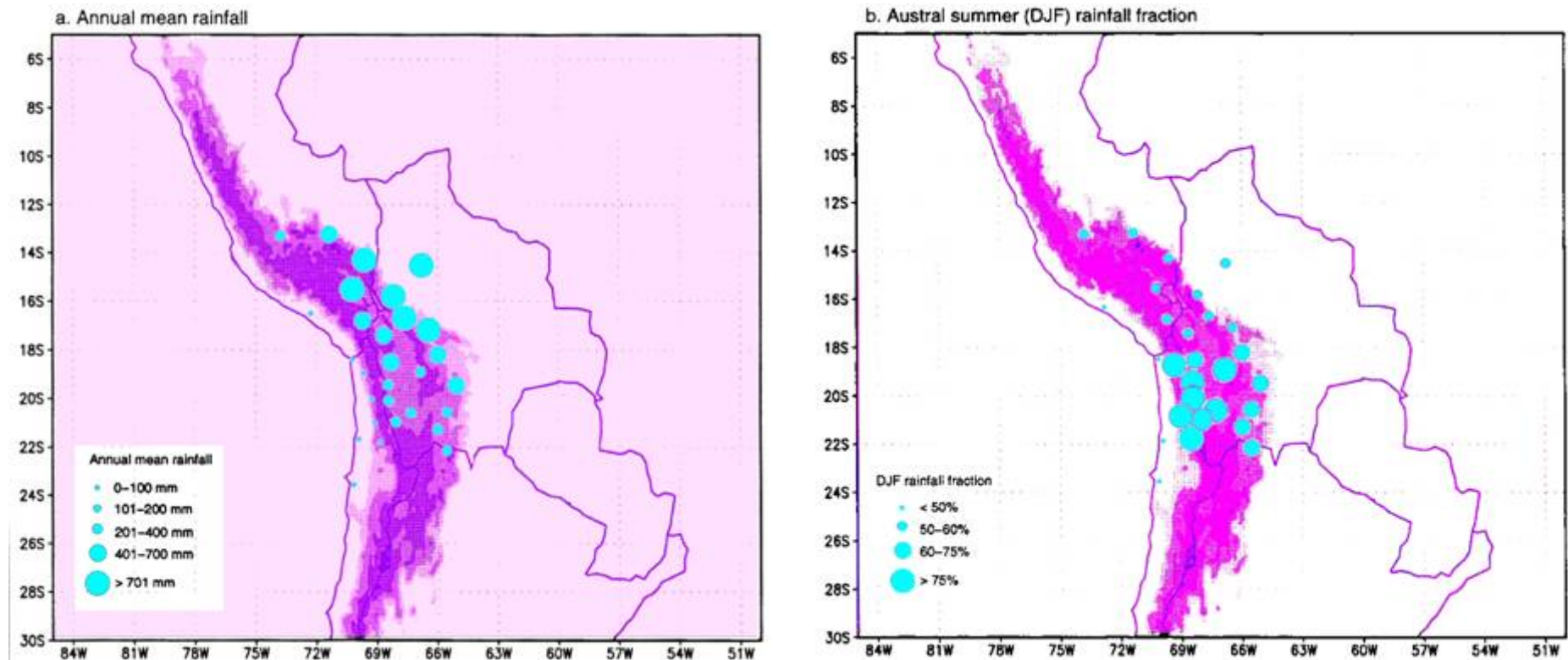


Evaluate the Influence of Climatic Variability on Vicuña Habitat Quality

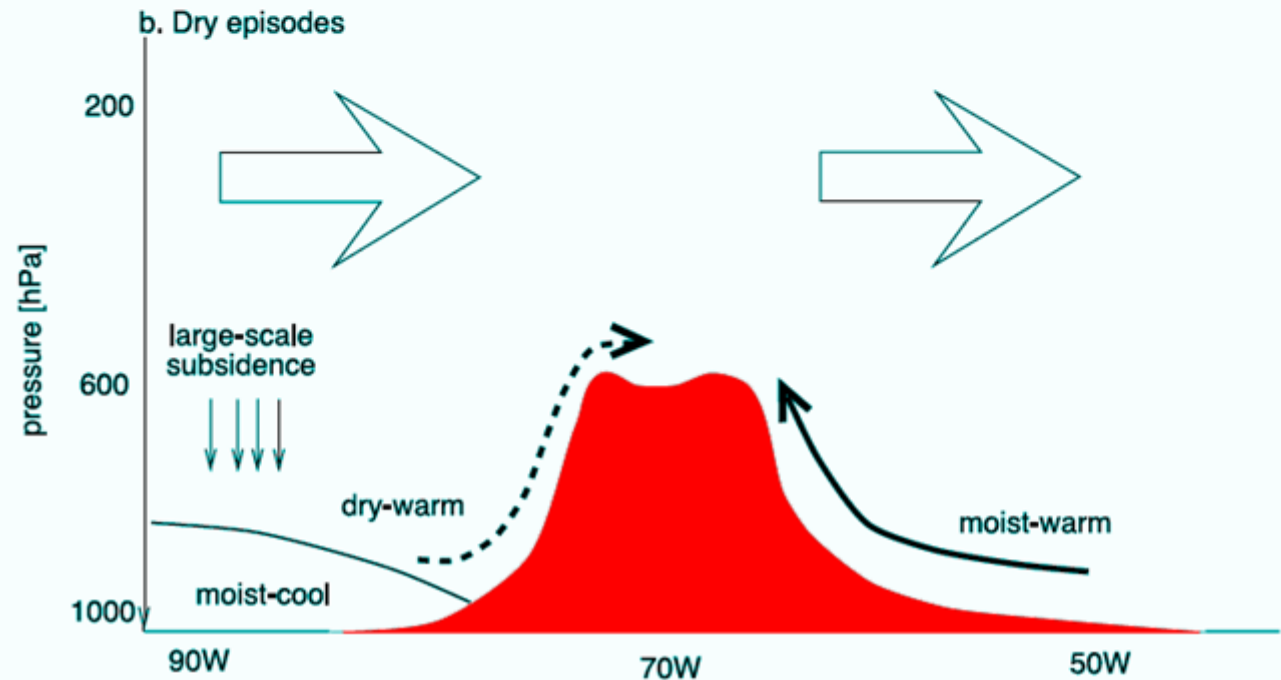
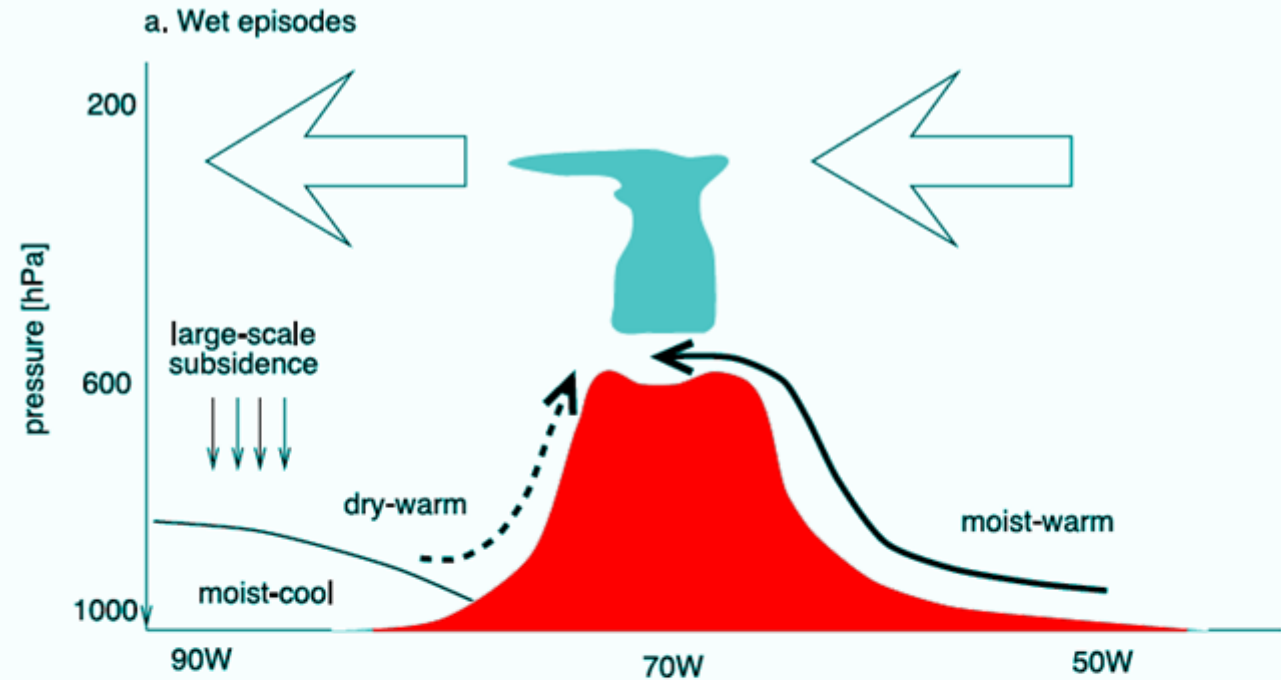
Introduction:

The climate of the altiplano

Altiplano climate: Rainfall in Chilean altiplano is concentrated in the austral summer



Altiplano climate is driven by seasonal changes in high altitude jet streams



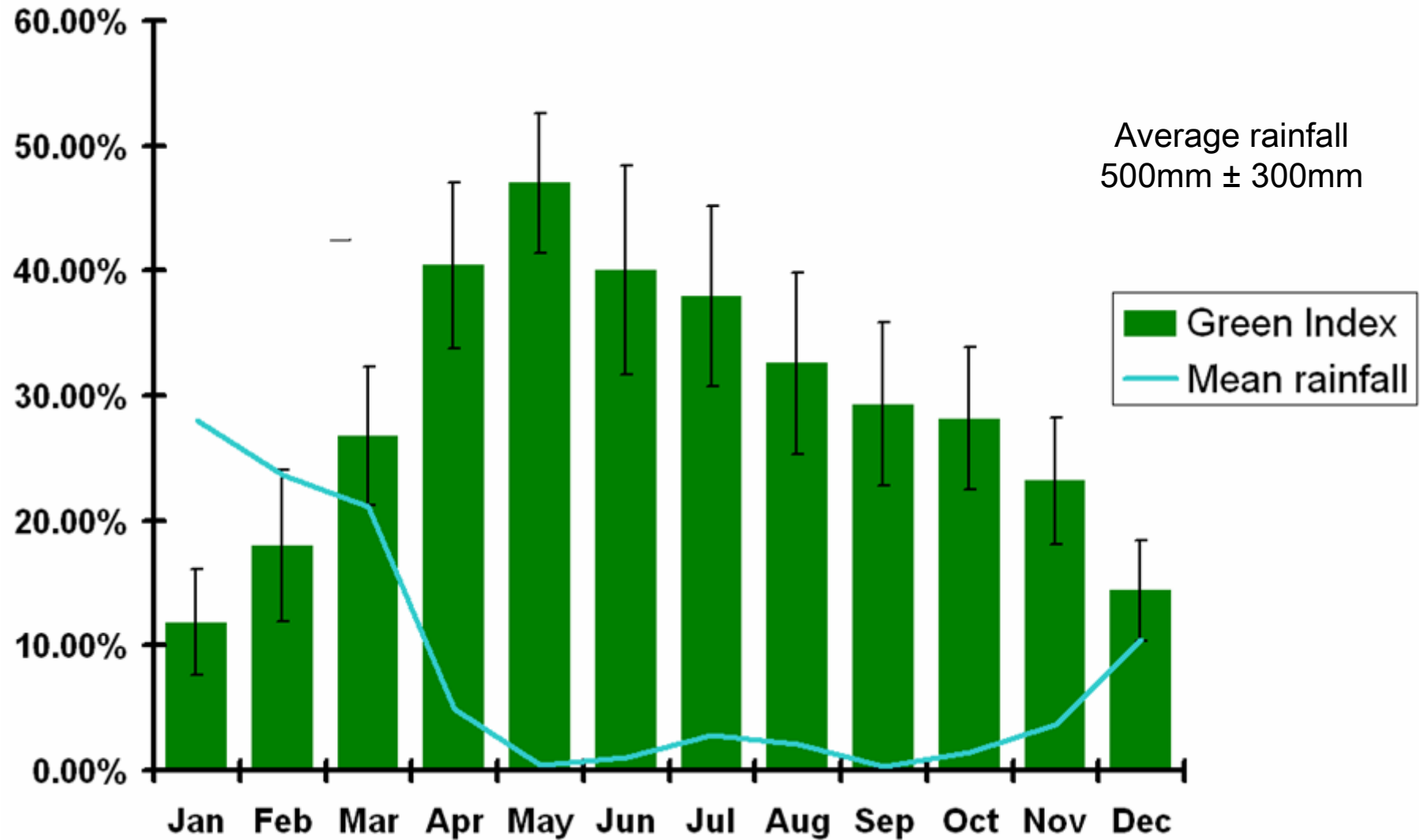


Evaluate the Influence of Climatic Variability on Vicuña Habitat Quality

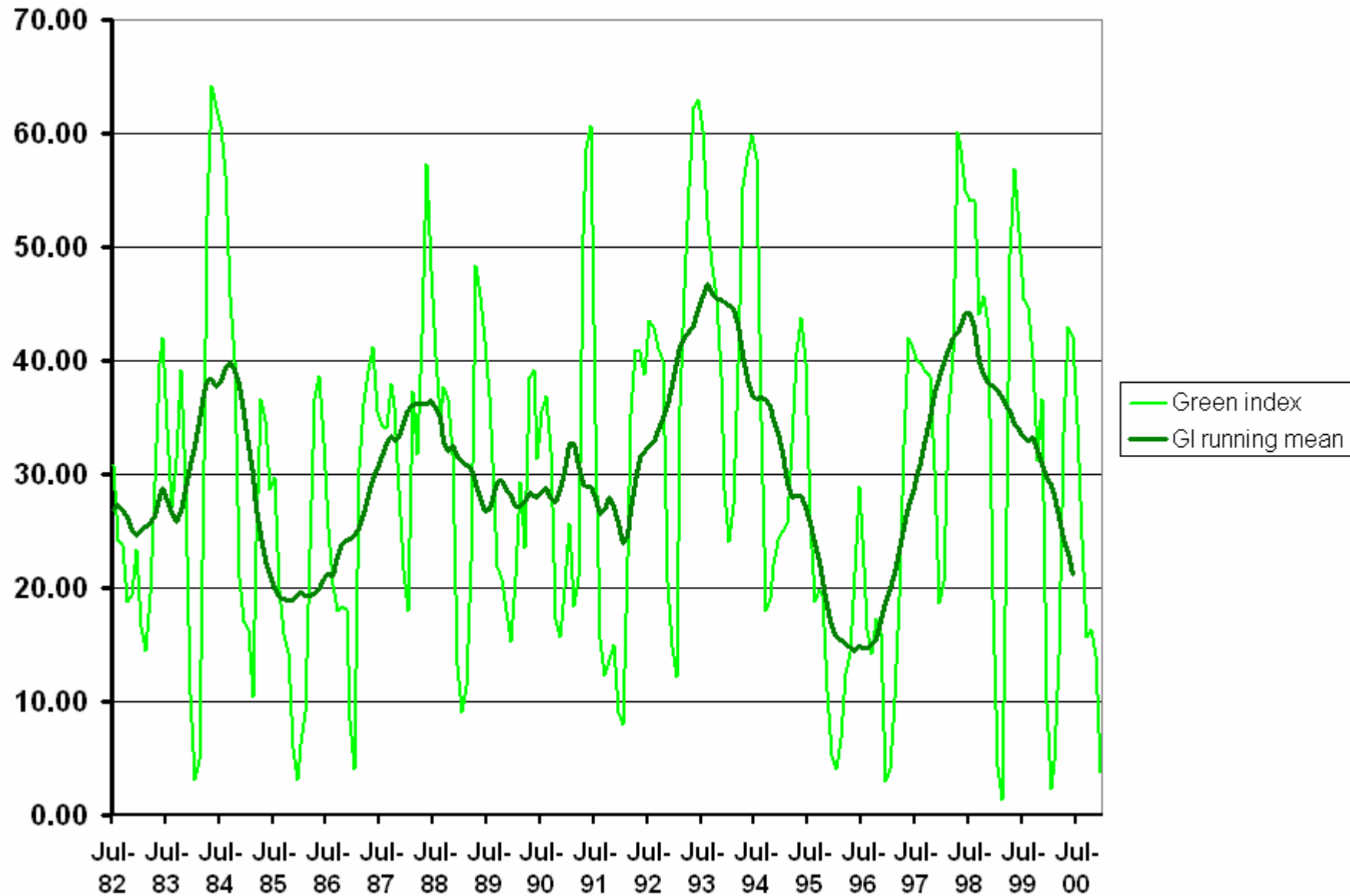
2. Remote sensing of vegetation using NDVI

Normalised Difference Vegetation Index

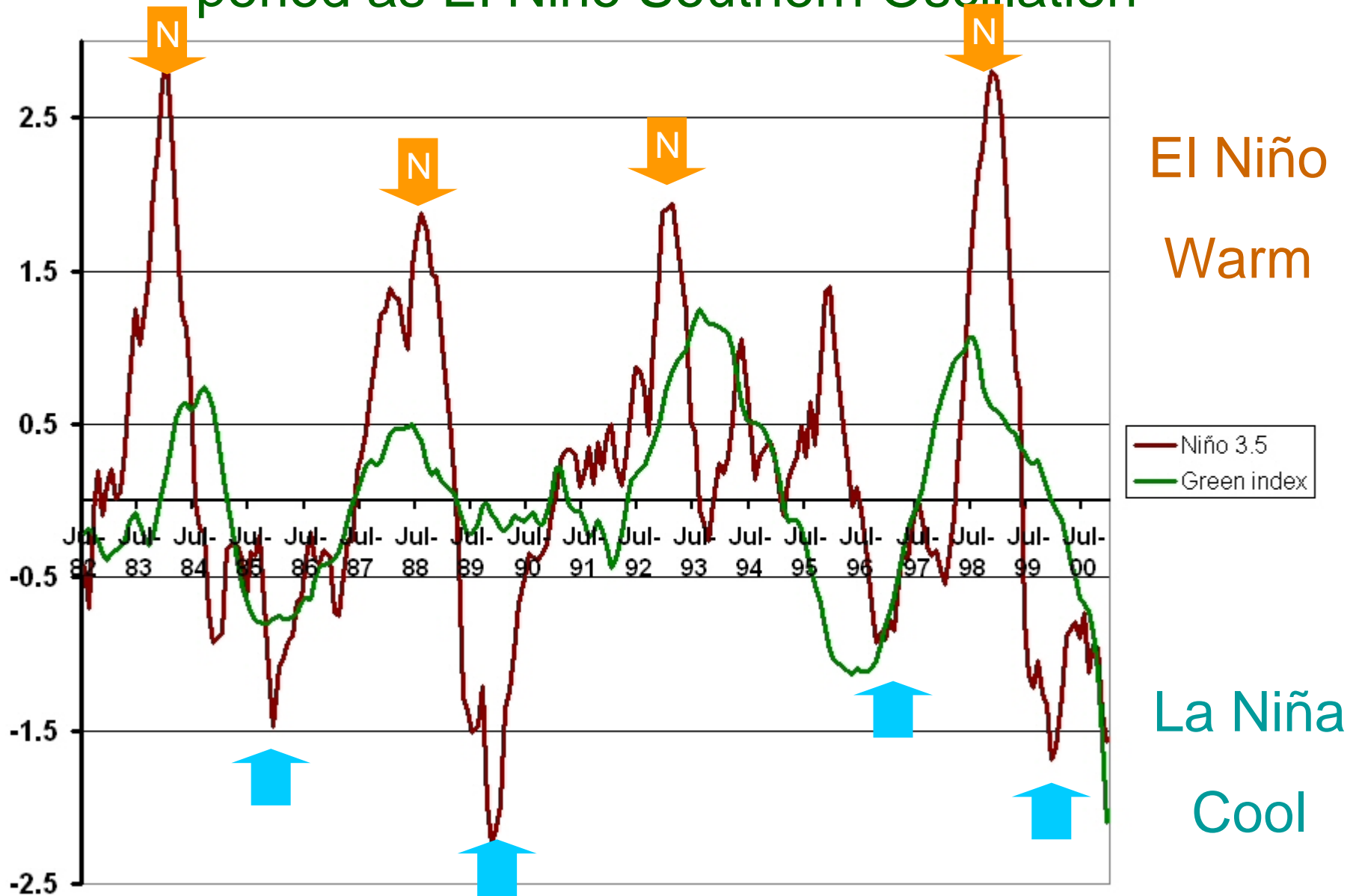
NDVI images show mean monthly changes in vegetation quality...



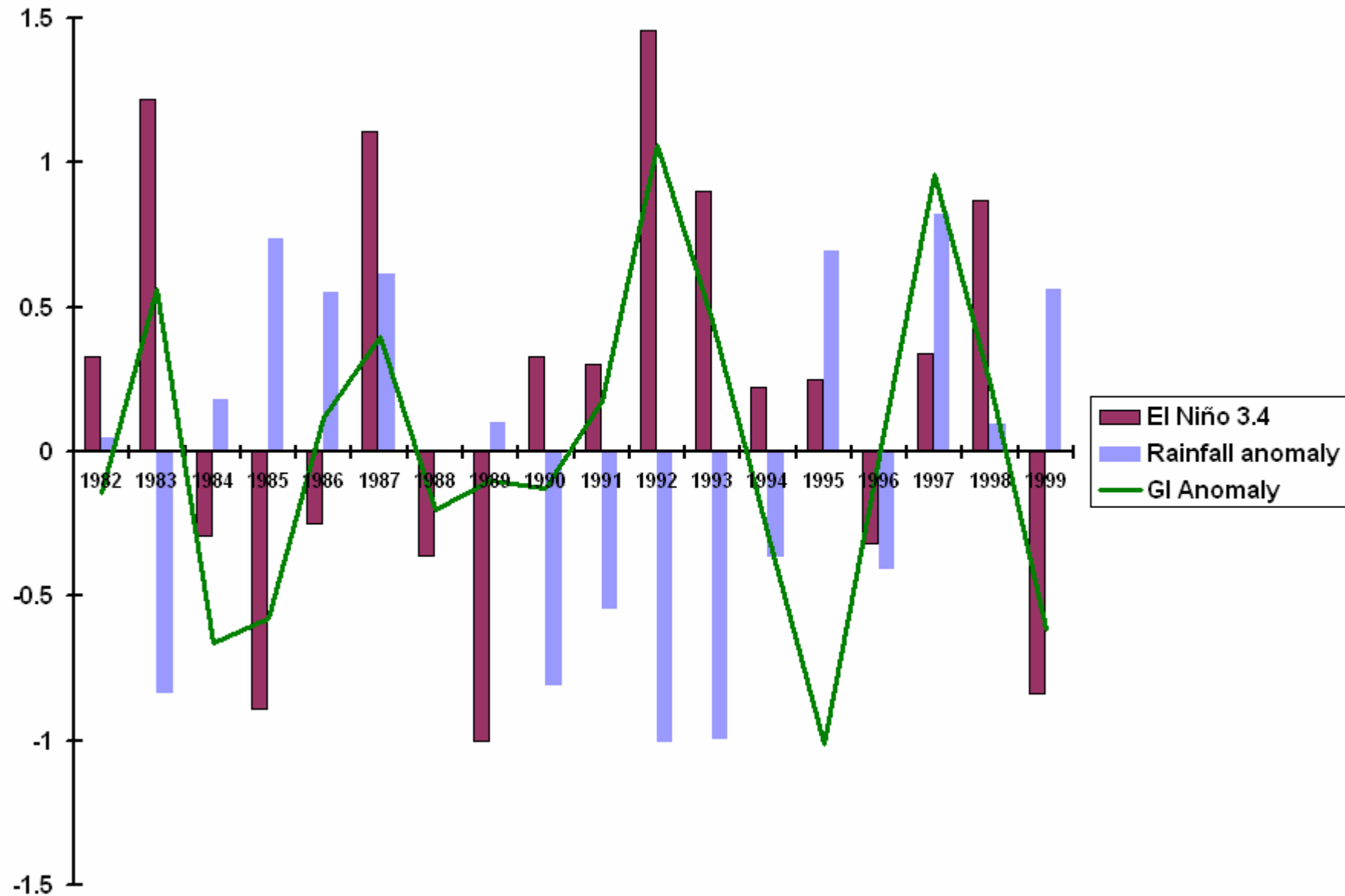
...and seasonal cycles



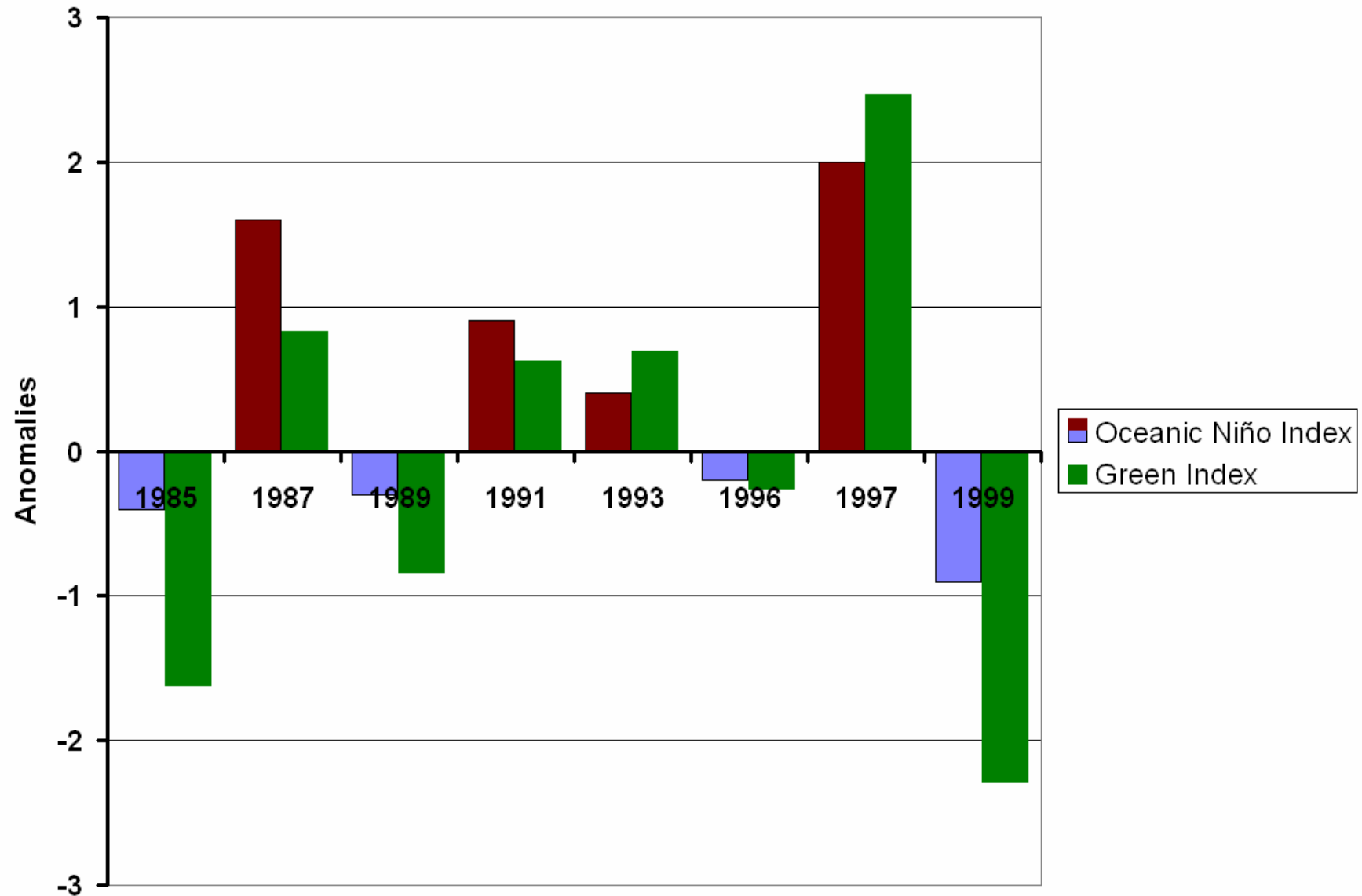
Annual cycles in rangeland condition occur with same period as El Niño Southern Oscillation



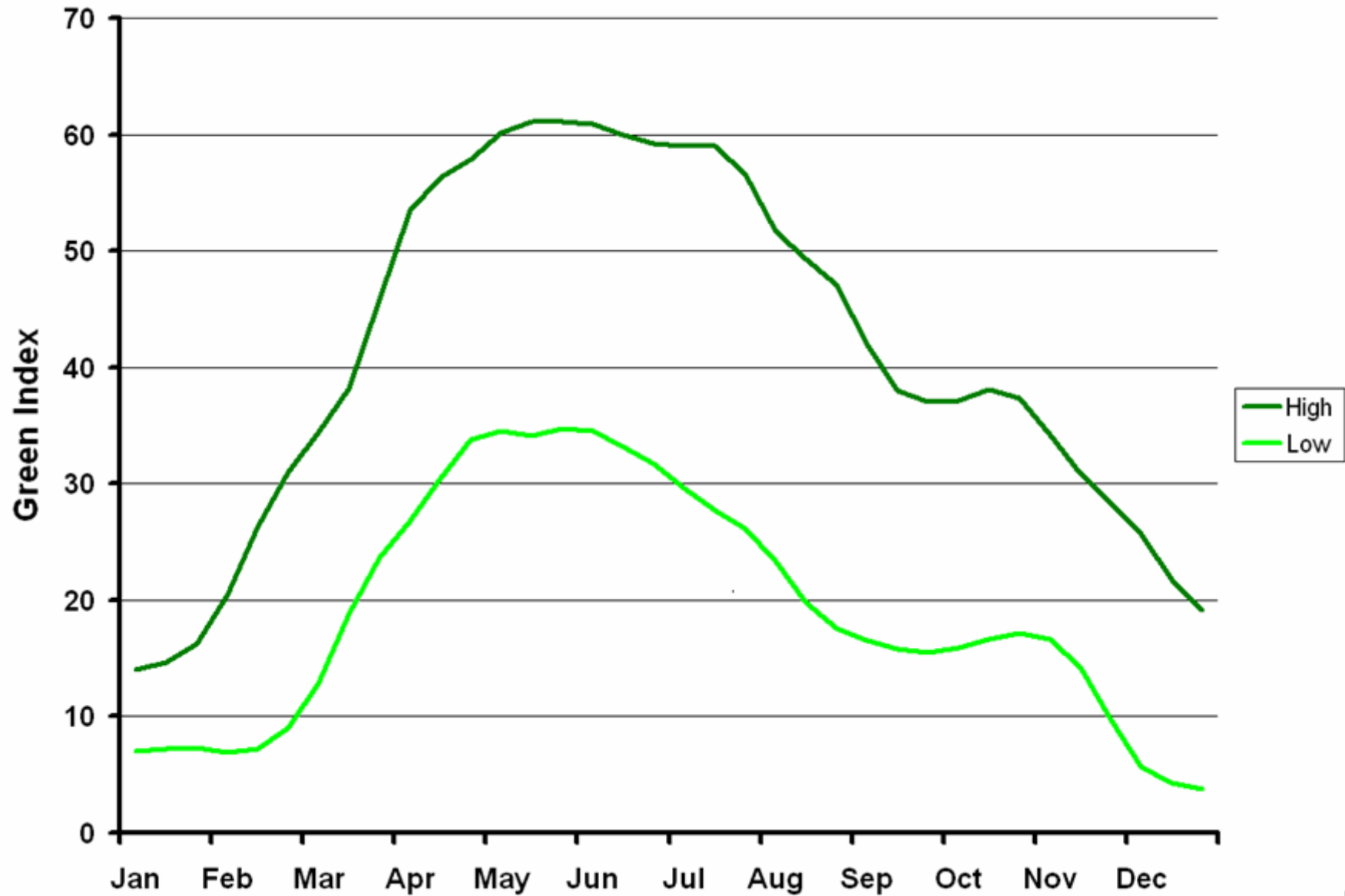
El Niño in altiplano is associated with warmer, drier seasons



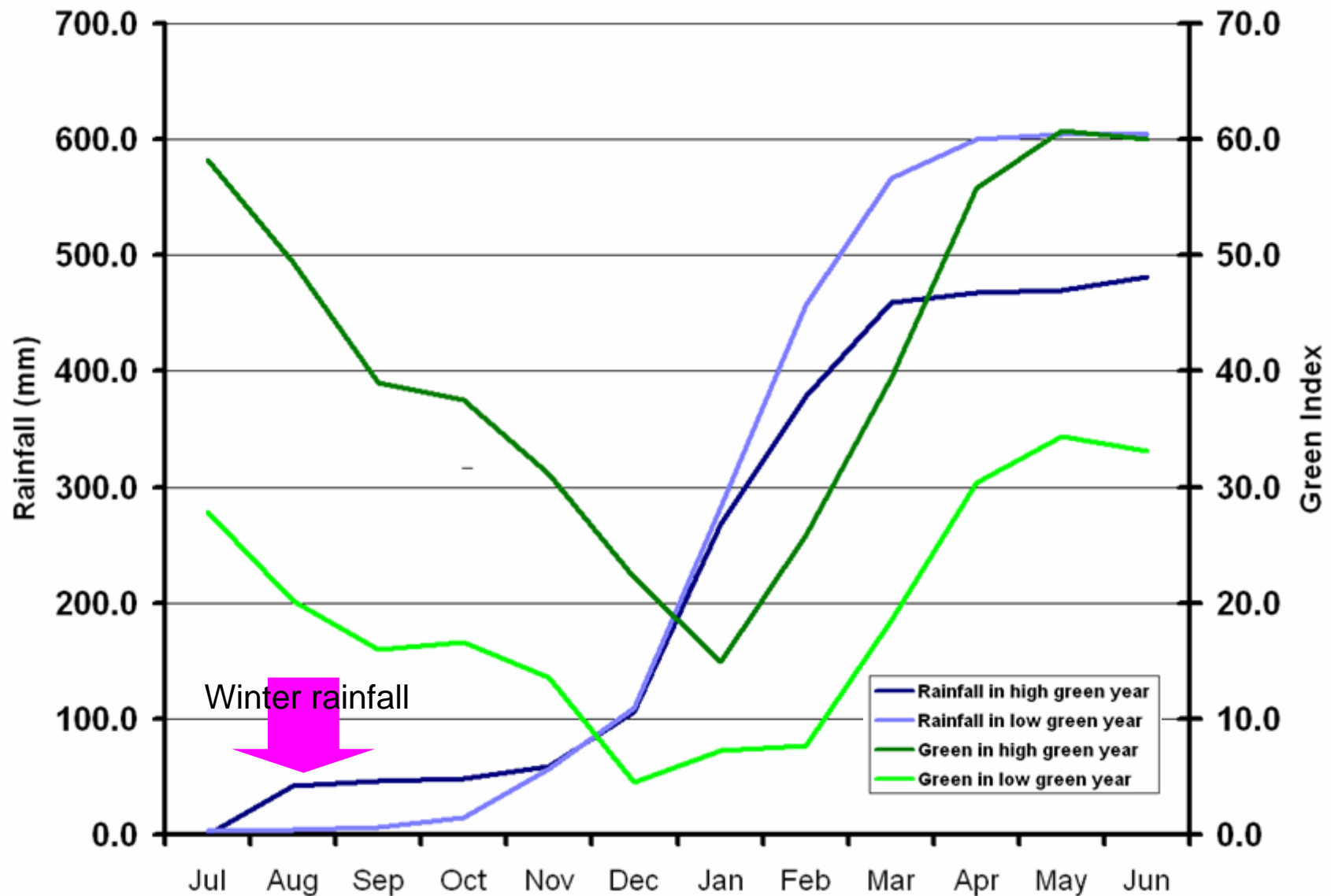
El Niño years do seem to be greener than average, and La Niña years have lower relative vegetation growth



Rangeland growth profile of high production years cv. low production years



Greener years may have lower total rainfall, but have less severe winter drought





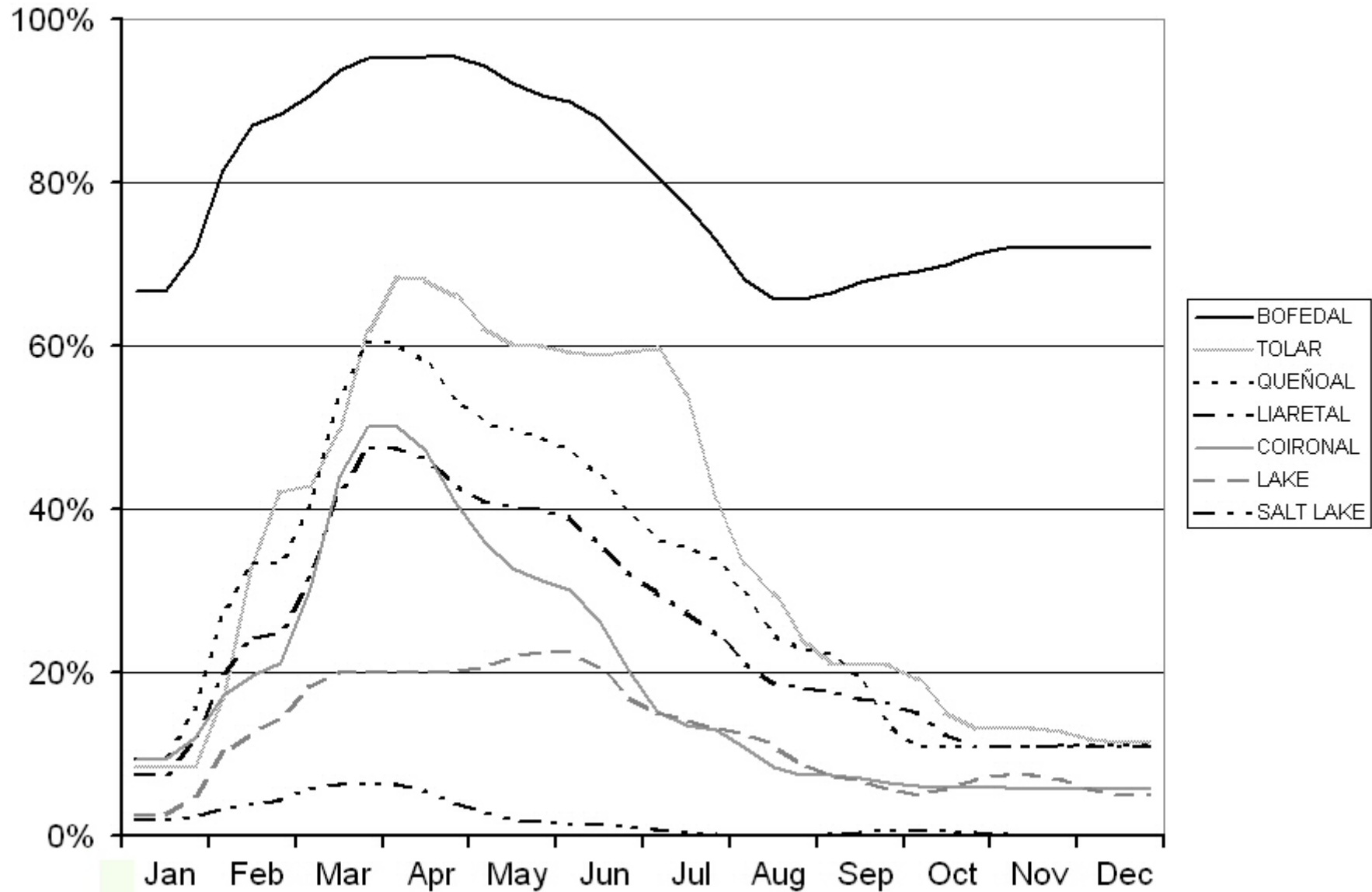
El Niño events are associated with warmer average temperature, and increased winter precipitation in the Chilean altiplano

The early onset of growth and warmer conditions encourages improved rangeland quality in years following El Niño events, in spite of the usually depressed rainfall



Some further applications of
NDVI in habitat evaluation

Greenness of different land cover



Relationship between habitat quality and vicuña population size is non-linear

