

Trends and ENSO/AAO driven variability in productivity and phenology in South America: comparing NDVI-VIP and NDVI3g results

Willem van Leeuwen and Kyle Hartfield

School of Natural Resources and the Environment
School of Geography and Development
Arizona Remote Sensing Center

University of Arizona, Tucson, USA



in collaboration with Marcello Miranda* and Francisco Meza*
*Centro de Cambio Global, UC, Santiago

Trends and ENSO/AAO driven variability in productivity and phenology in South America using 30 years of NDVI time series data

Questions:

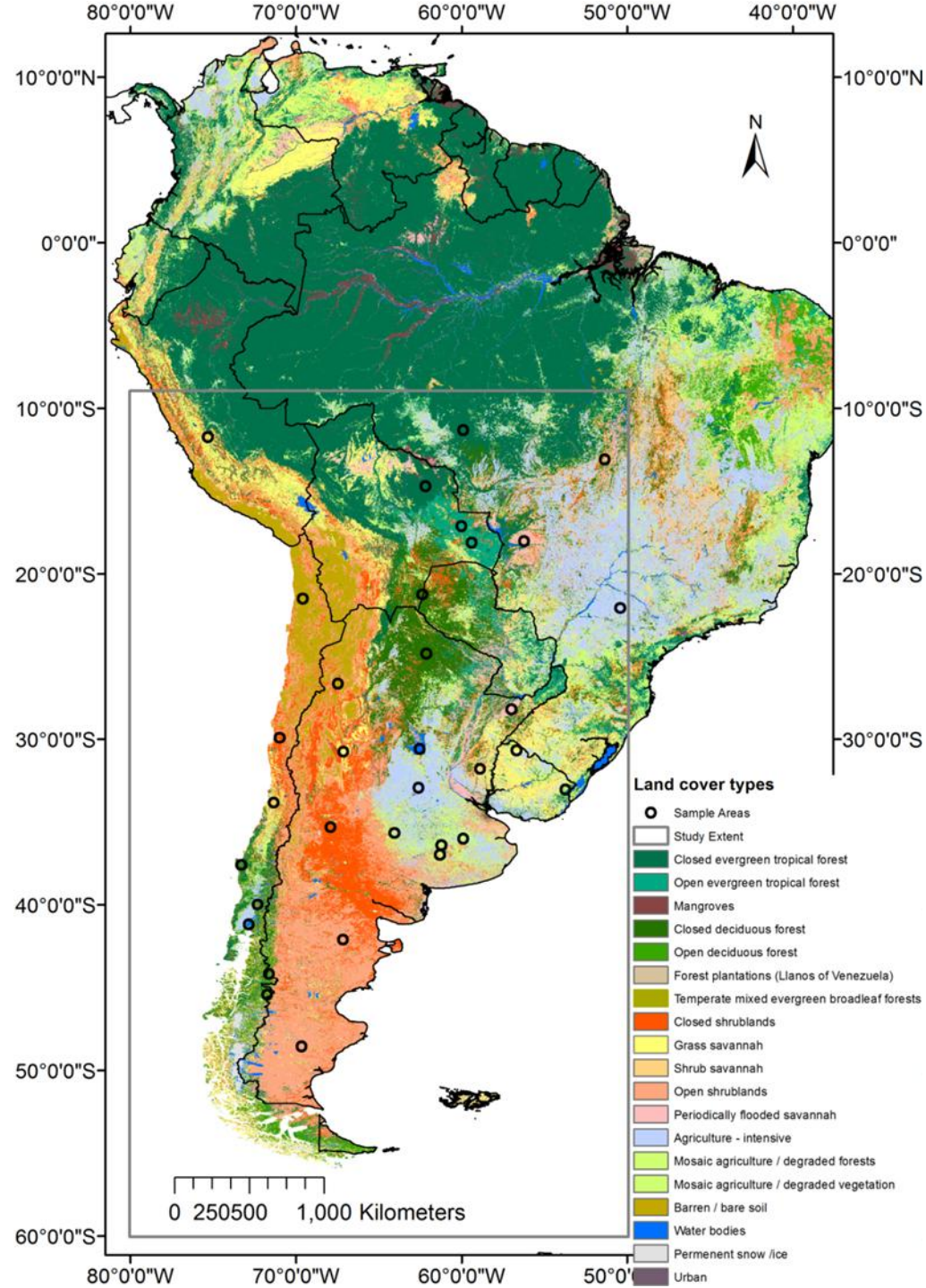
- What are the land use and climate impacts on vegetation productivity and phenology?
- What trends do we observe in vegetation productivity and phenology during 30 years?
- Do the 30-year NDVI time series of VIP and GIMMS-3g show the same results?

DATA

- NDVI VIP2 – 1981 thru 2010 (15-day - 5km)
- NDVI 3G – July 1981 thru 2011 (15-day - 8km)
- Study area - South America between the Latitudes of 9°S - 60°S and the Longitudes of 50°W - 80°W
- Land cover classes including Desert, Shrubland, Grassland, Deciduous Forest, Savannah, and Barren (Eva et al, 2004)

METHODS

- Simple linear regression analysis ($P < 0.05$)
- Trends - $NDVI = f(\text{time})$; $SOS = f(t)$; $LOS = f(t)$
- $\text{Productivity/phenology} = f(\text{MEI})$; $\text{Productivity/phenology} = f(\text{AAO})$
- MEI and AAO – T. and Precip. shifts

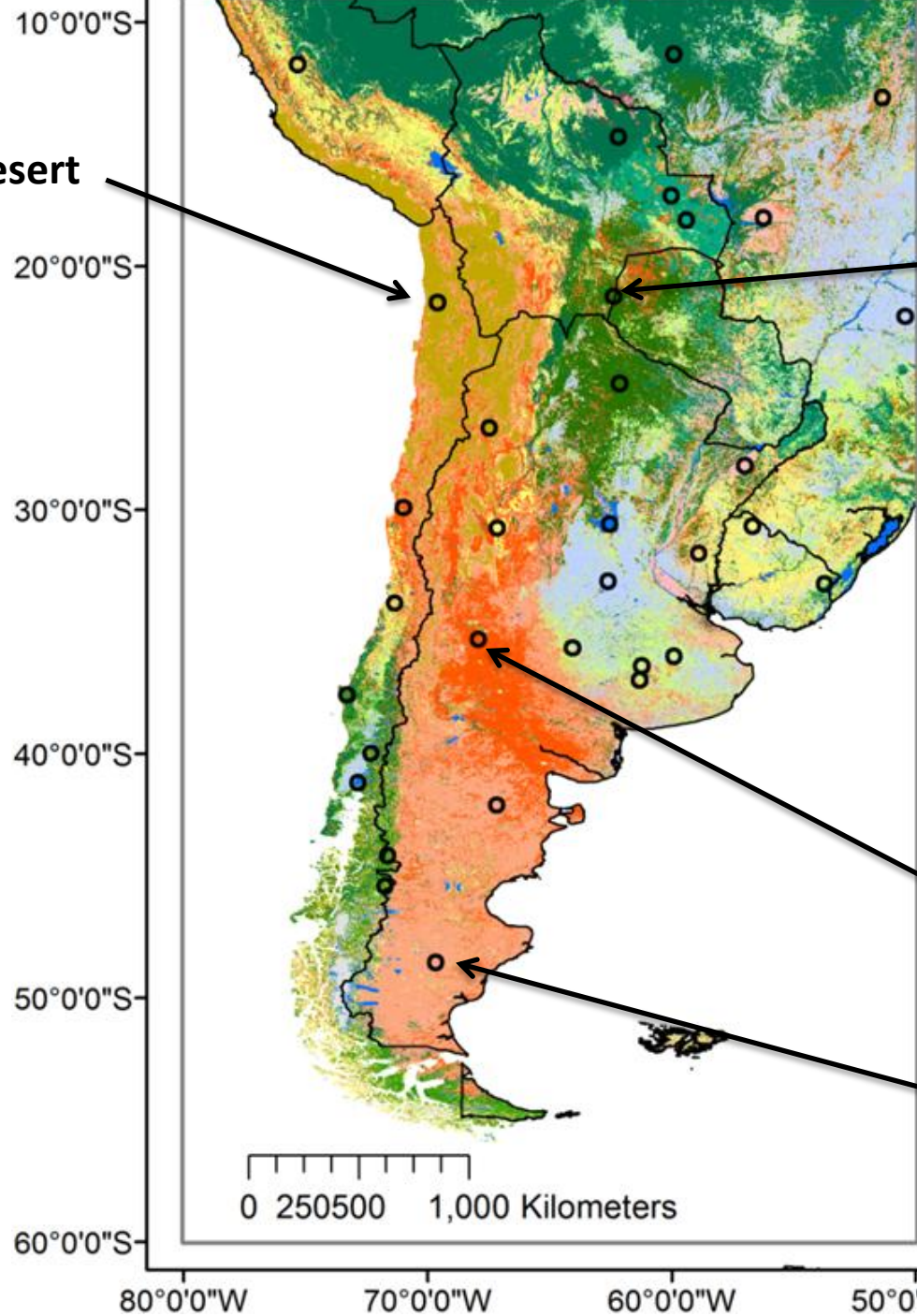


Desert

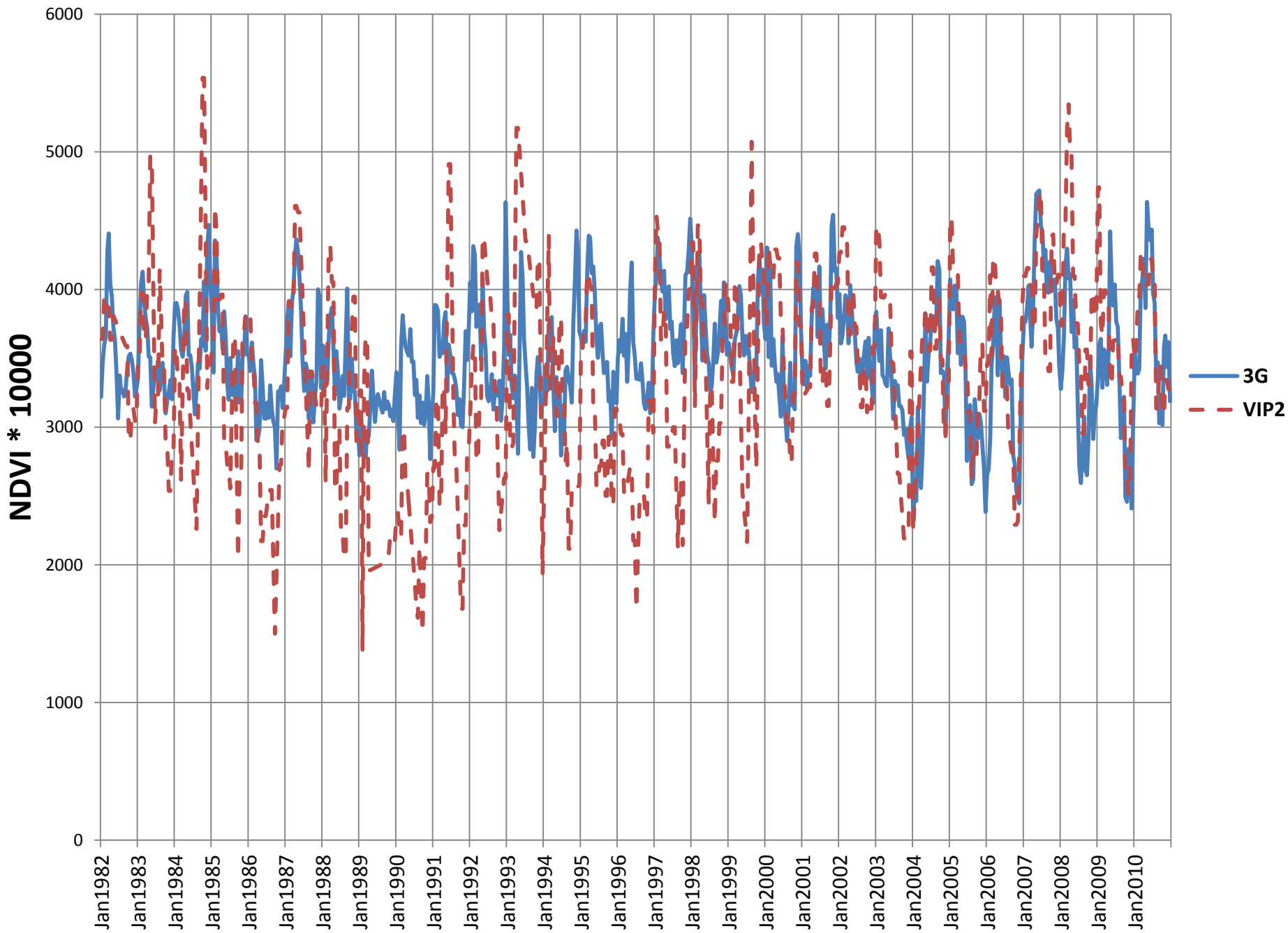
**Closed
Deciduous
Forest**

**Closed
Shrublands**

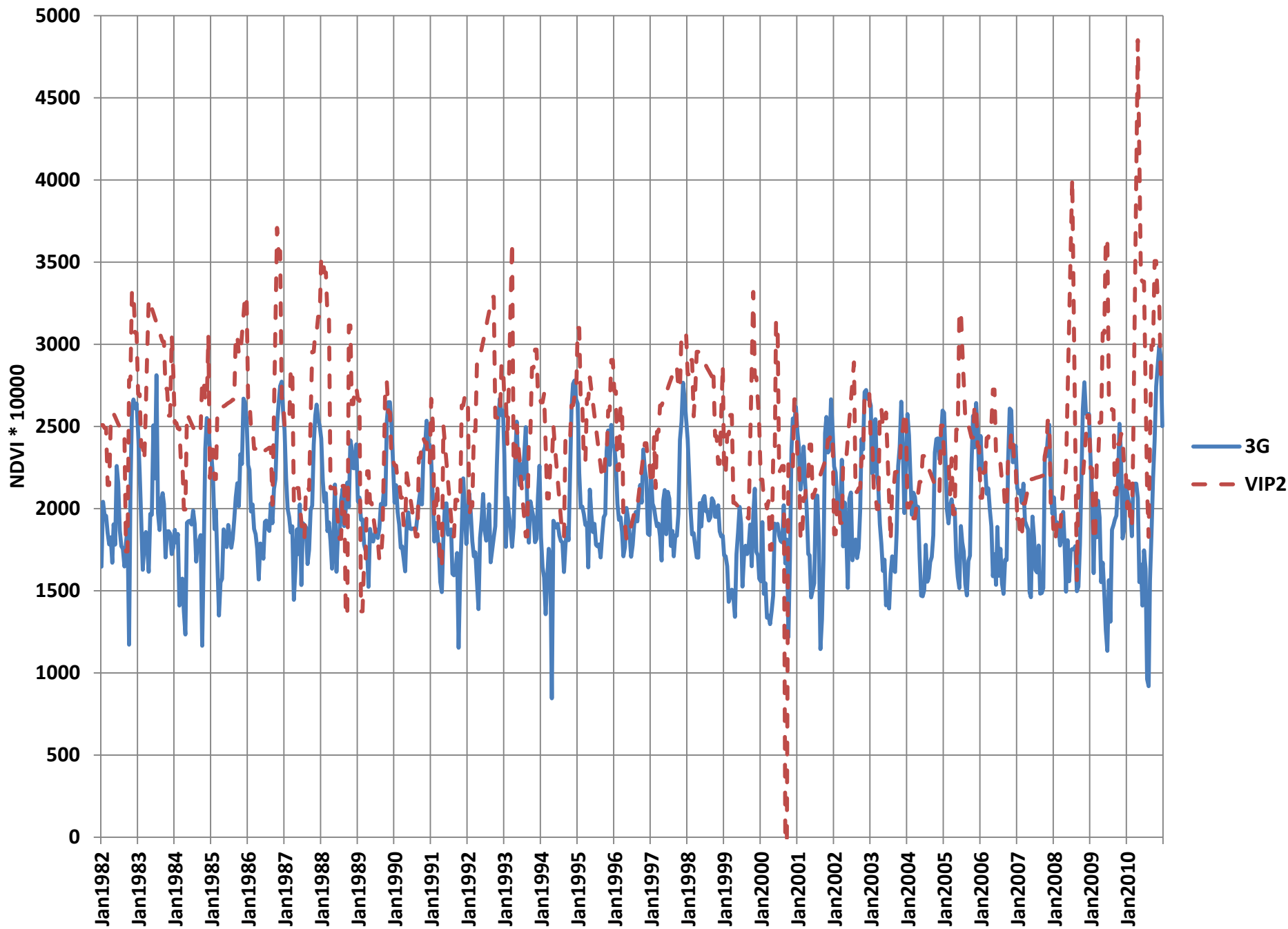
**Open
Steppe
Grasslands**



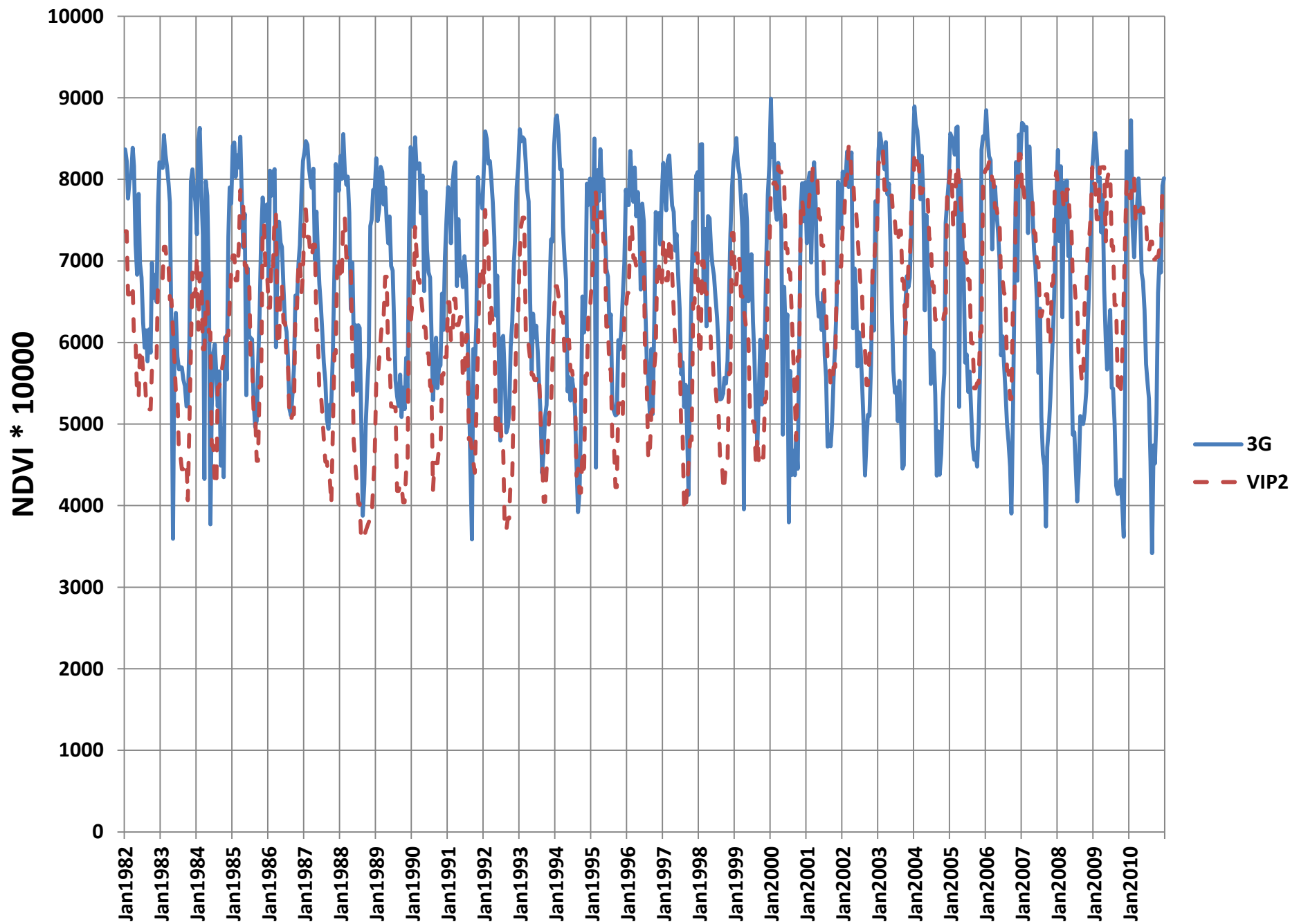
Closed Shrublands



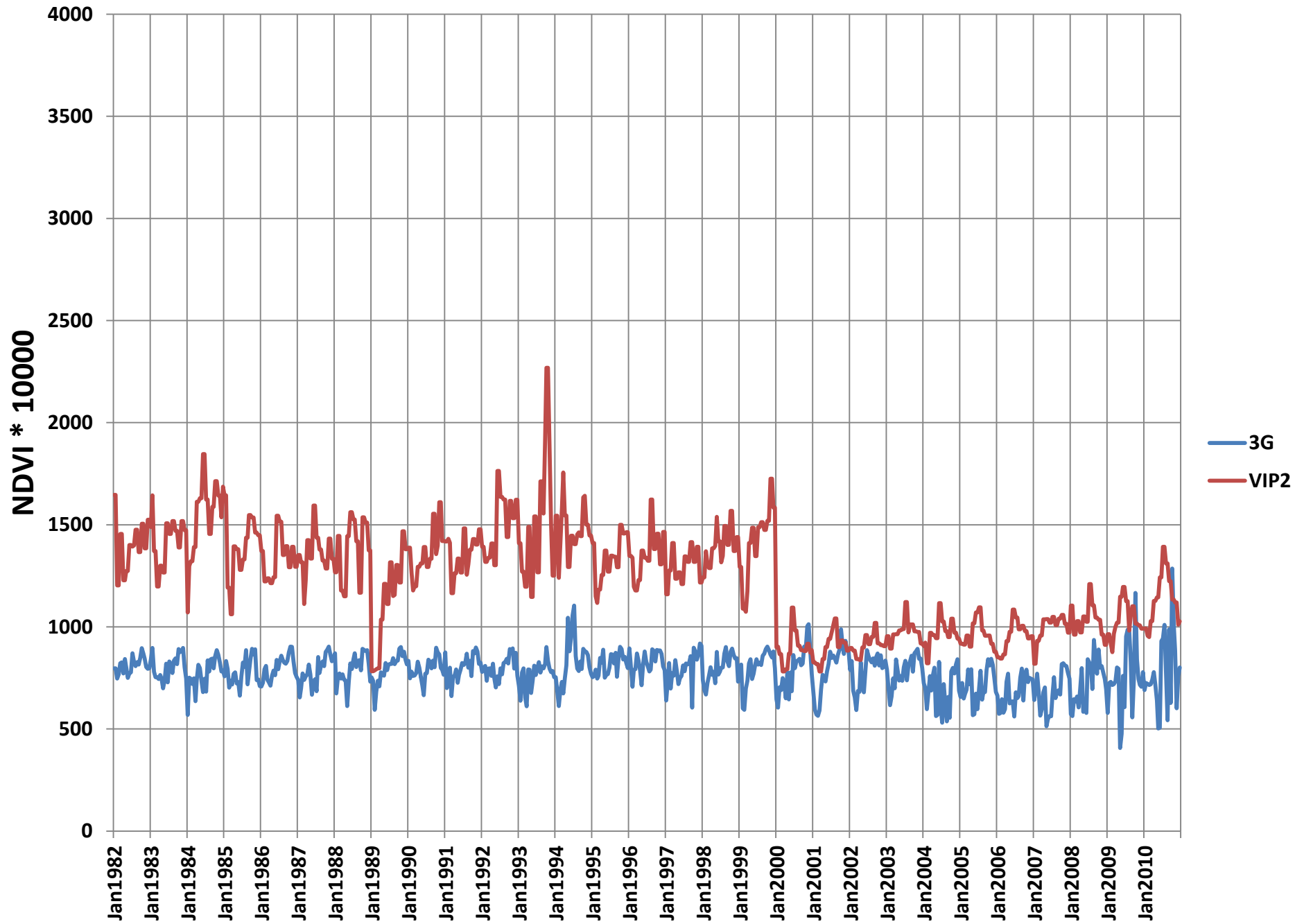
Open Steppe Grassland



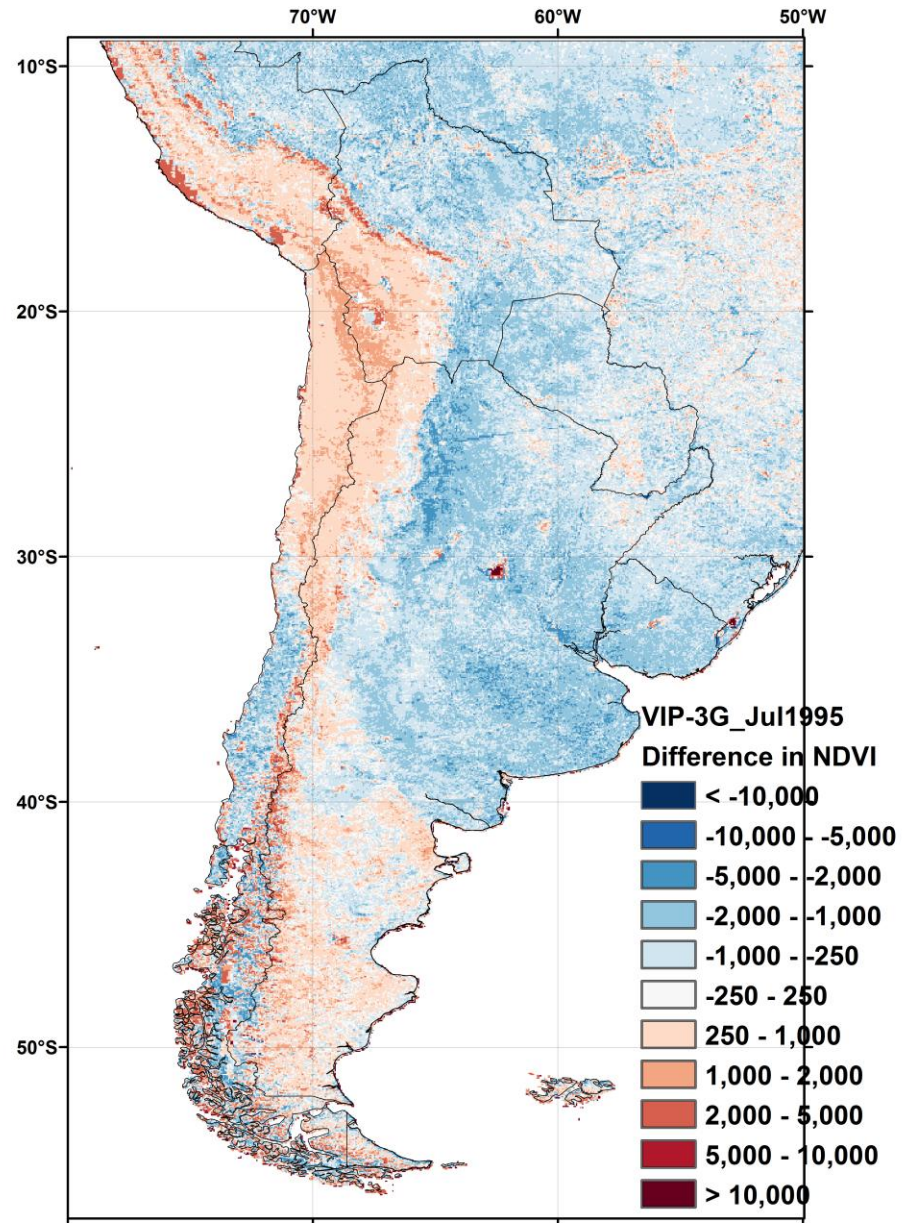
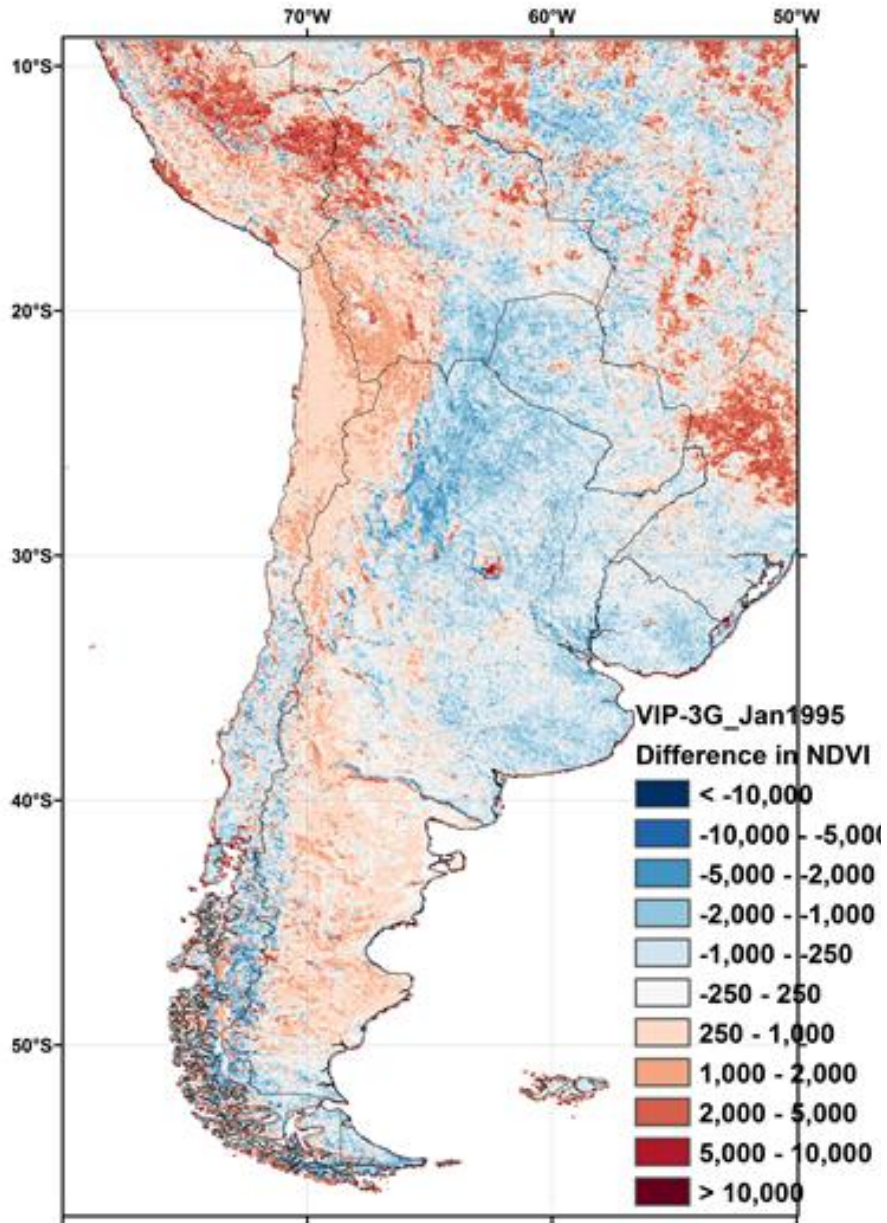
Closed Deciduous Forest



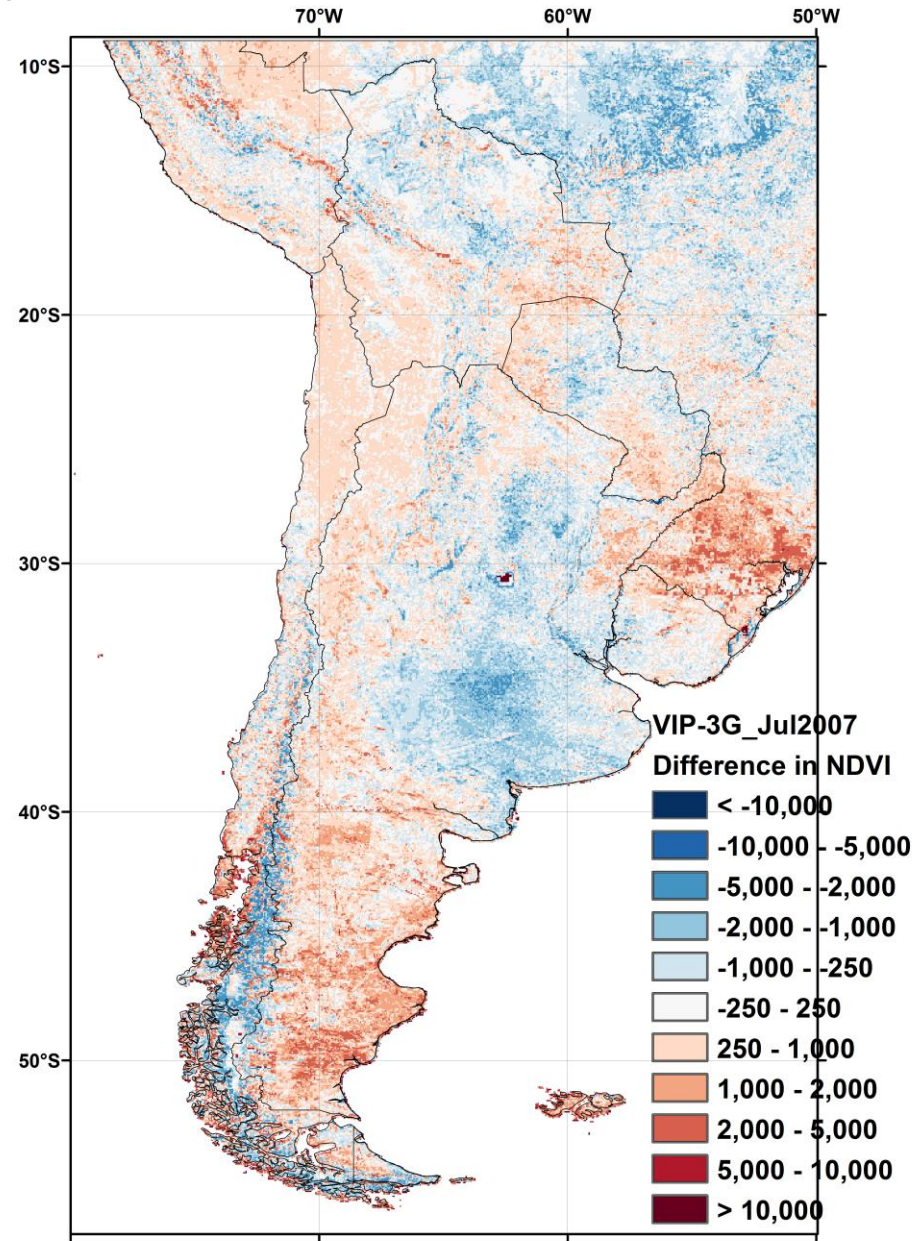
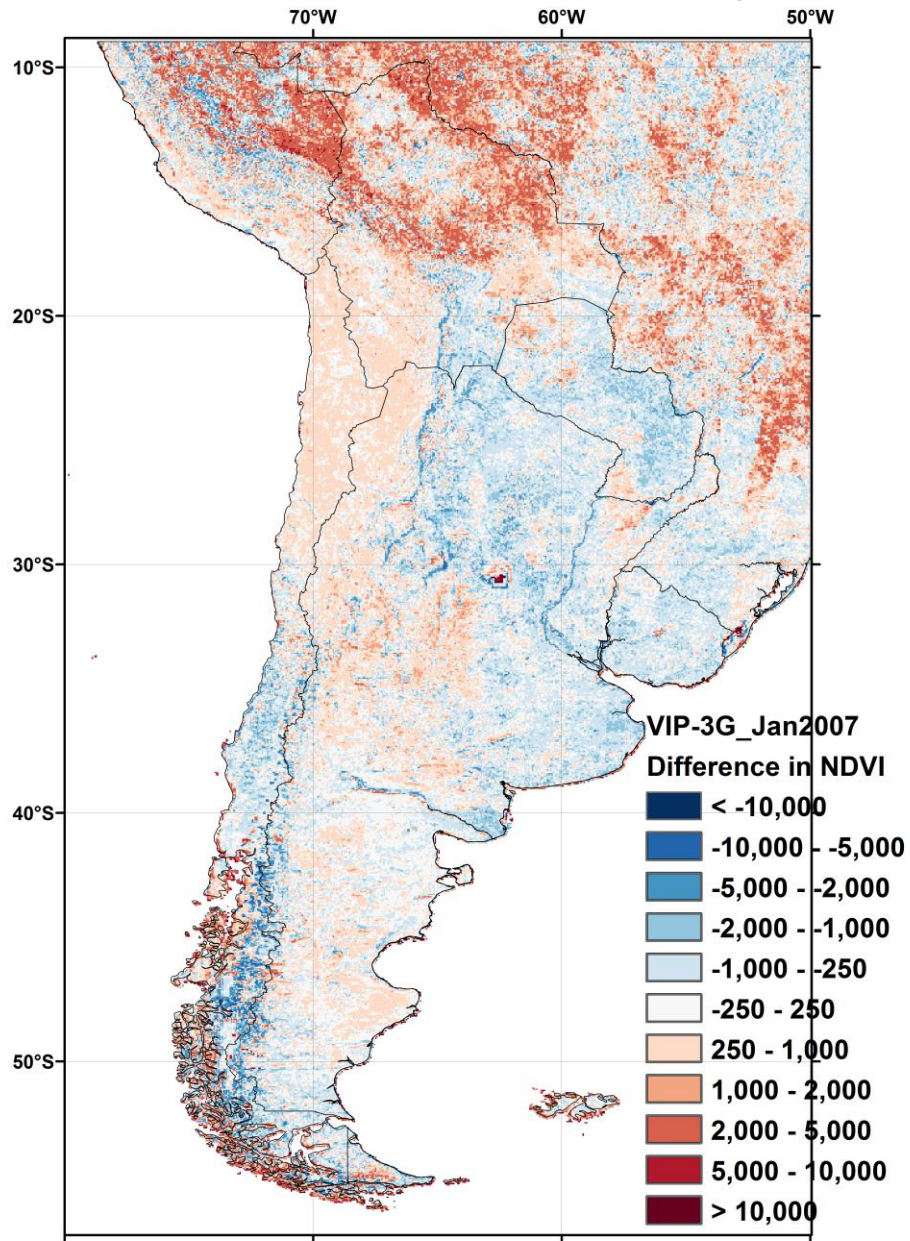
Desert

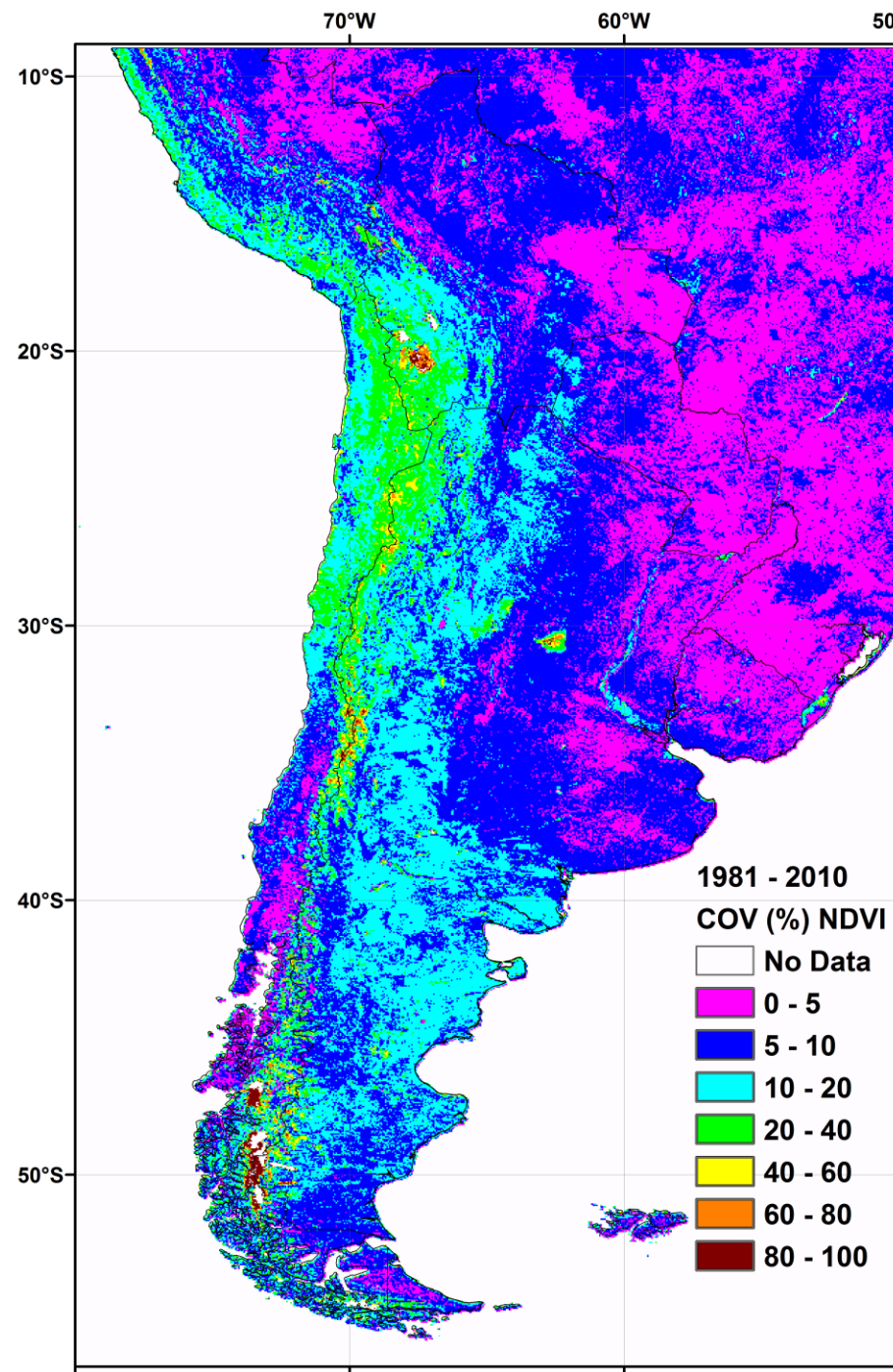
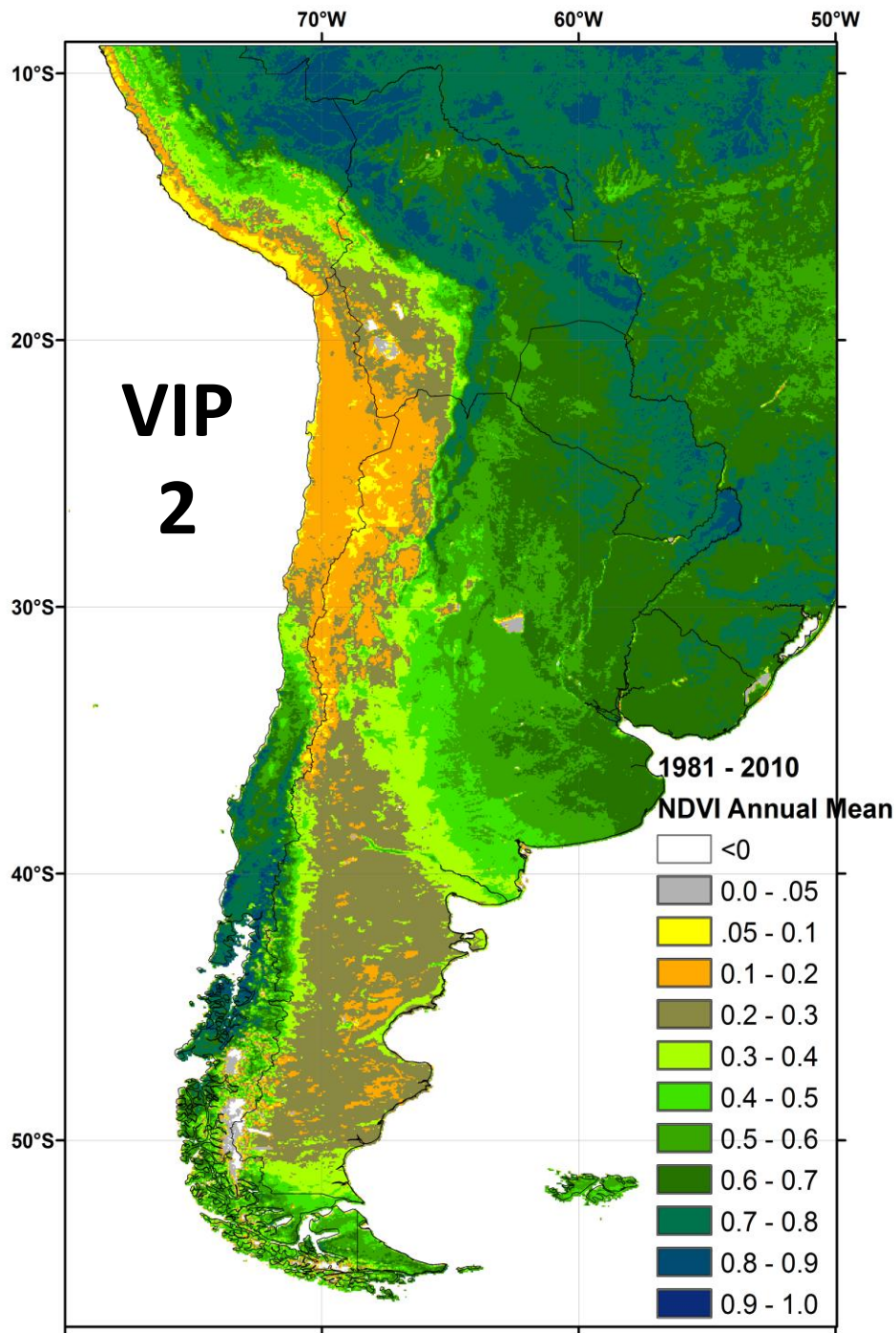


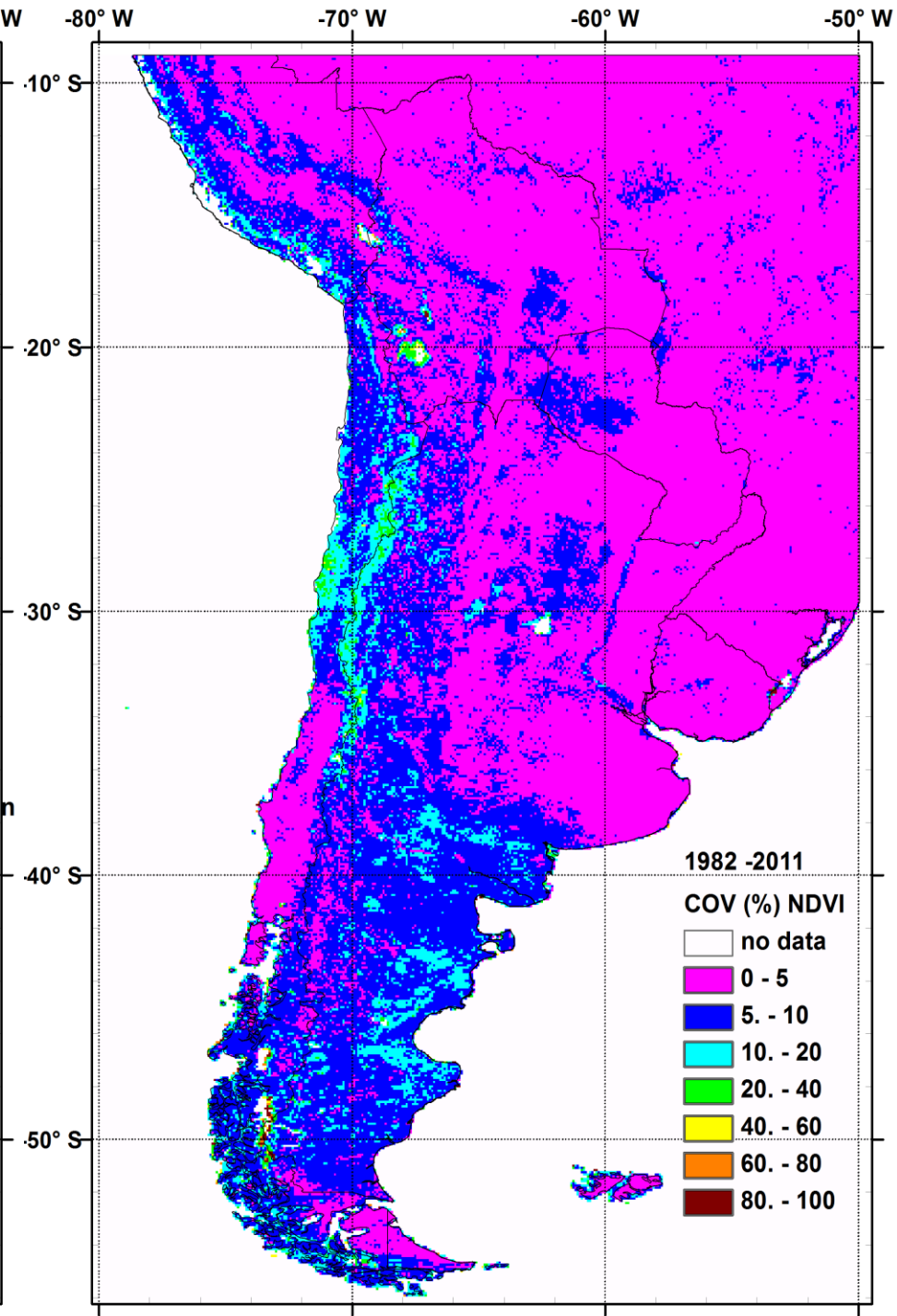
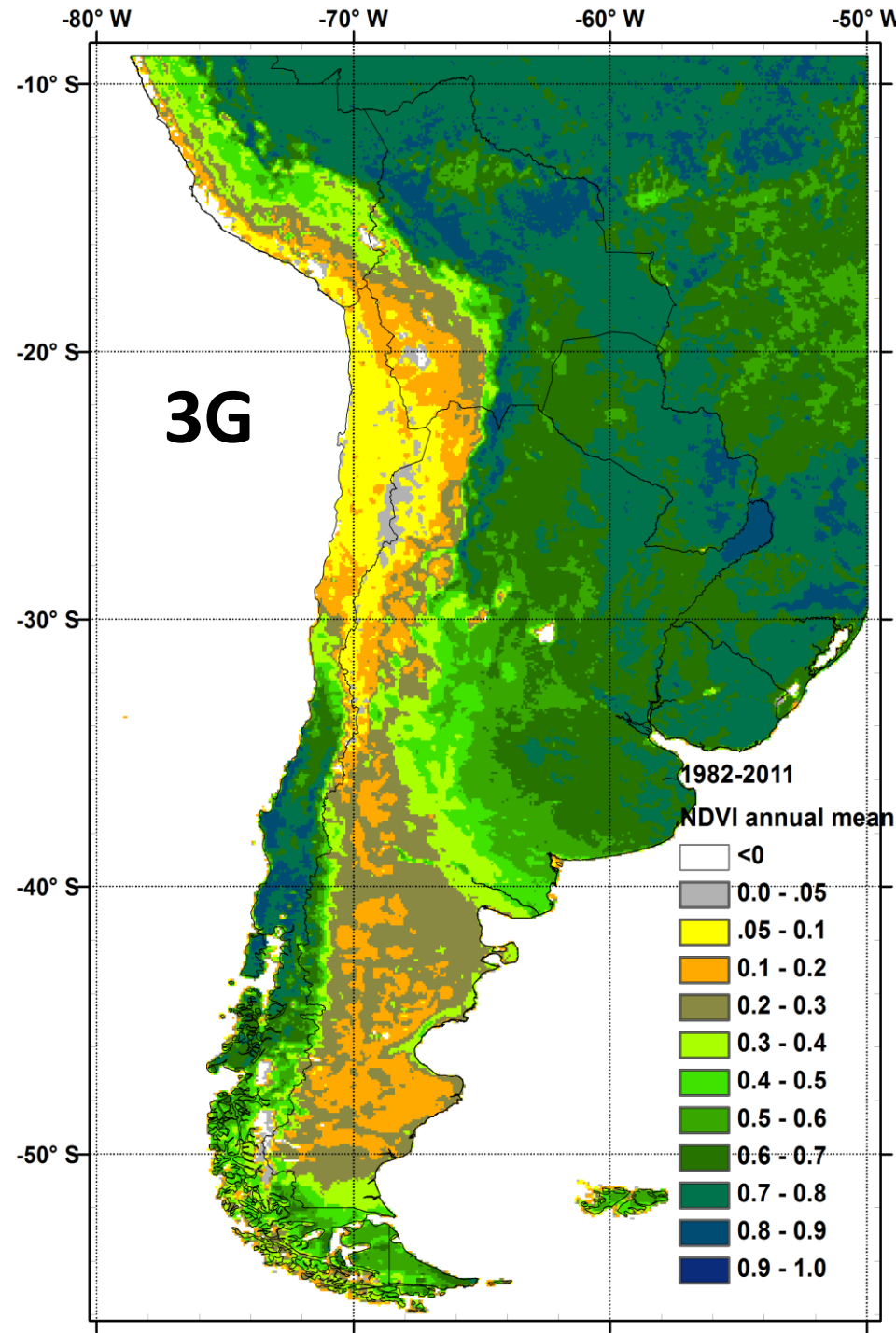
NDVI difference (VIP-3g) for Jan and Jul 1995

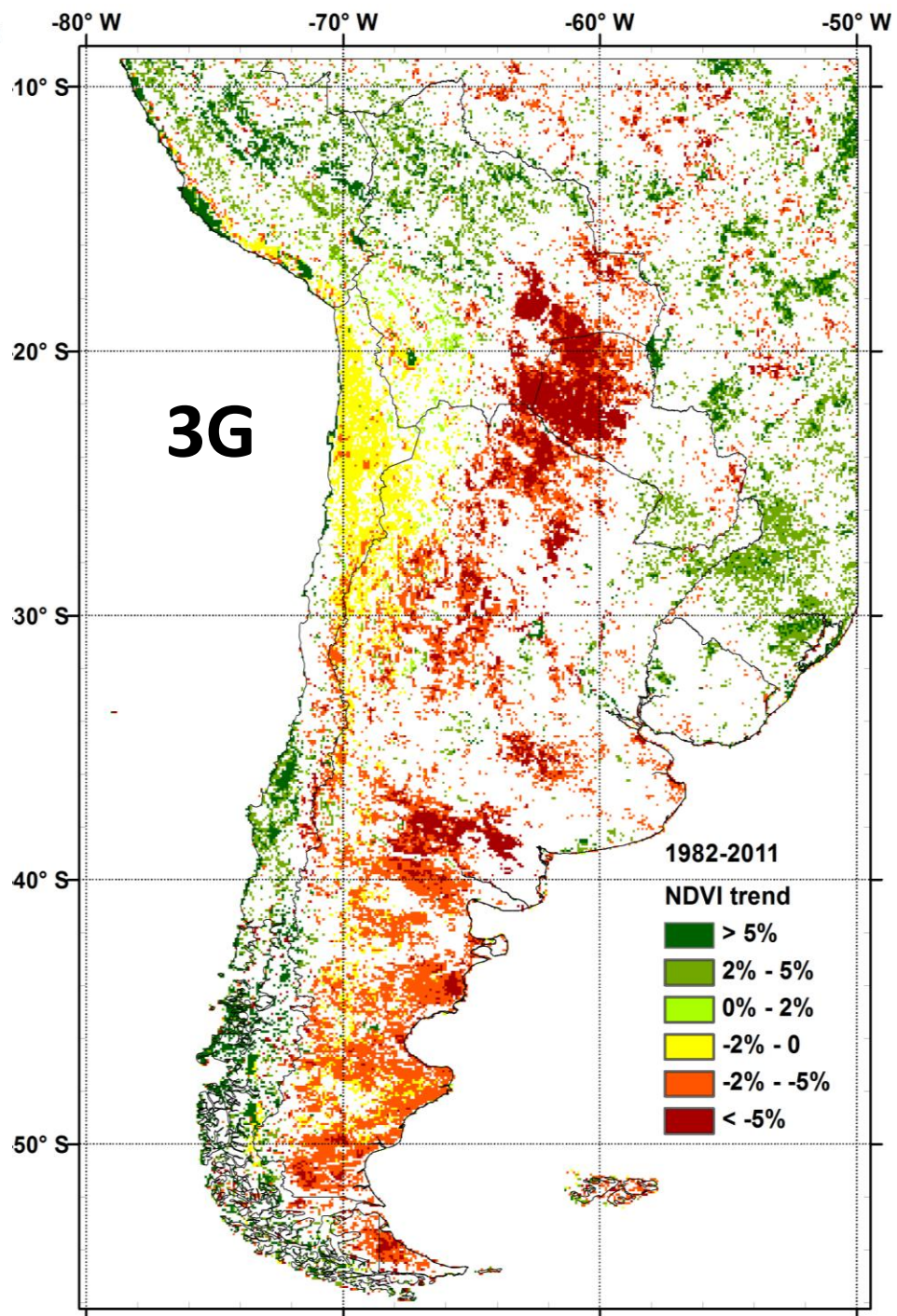
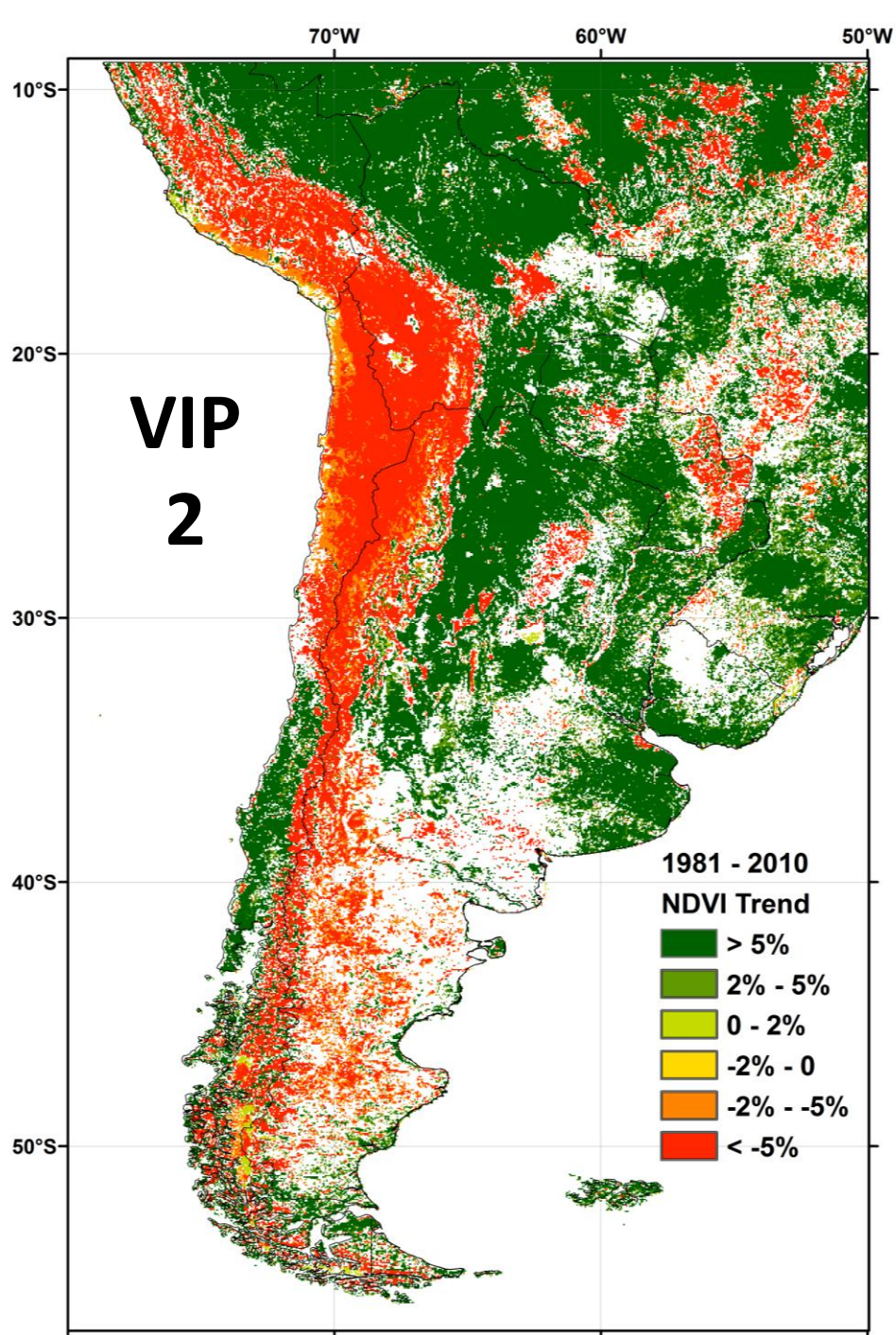


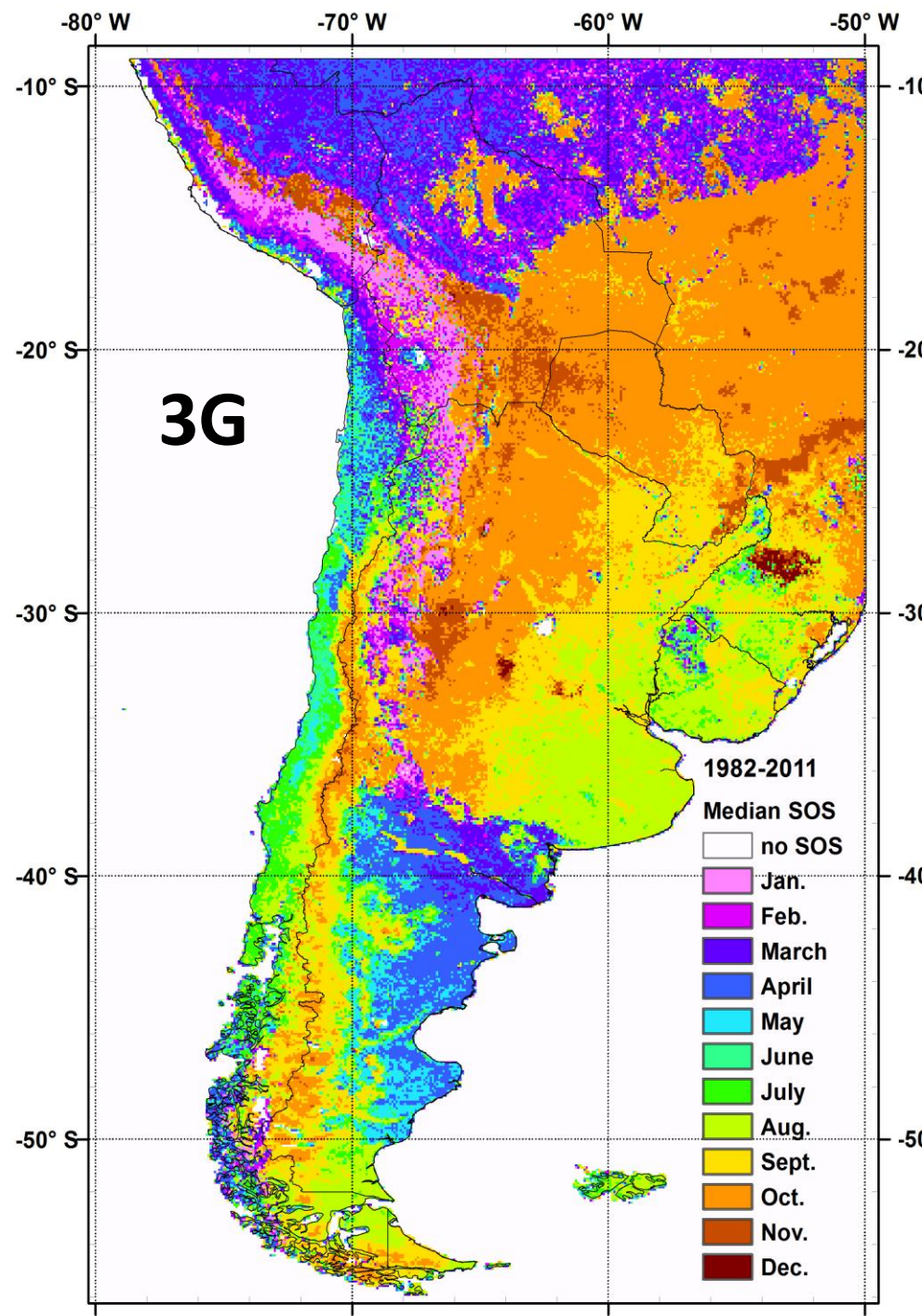
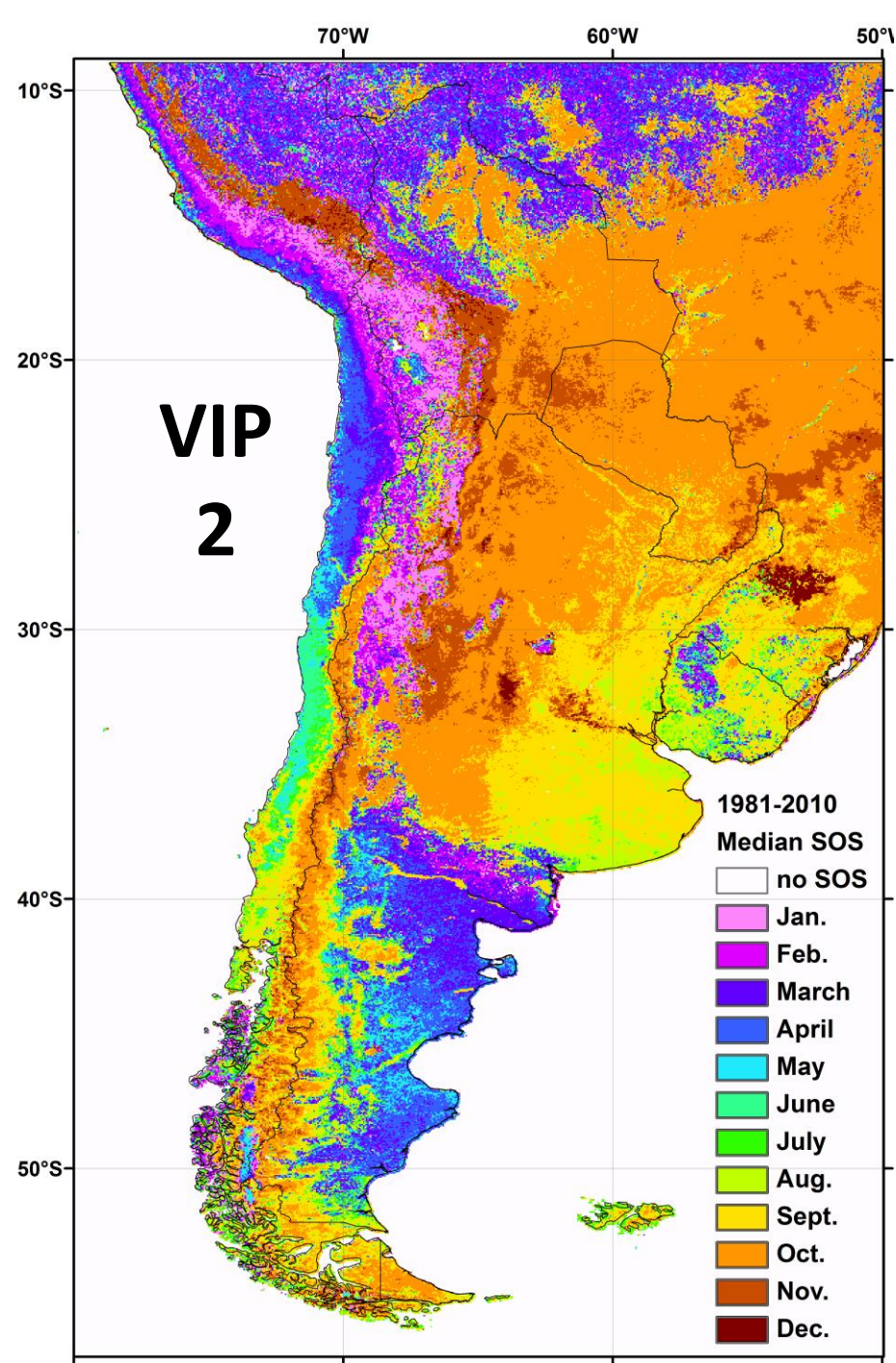
NDVI difference (VIP-3g) for Jan and Jul 2007

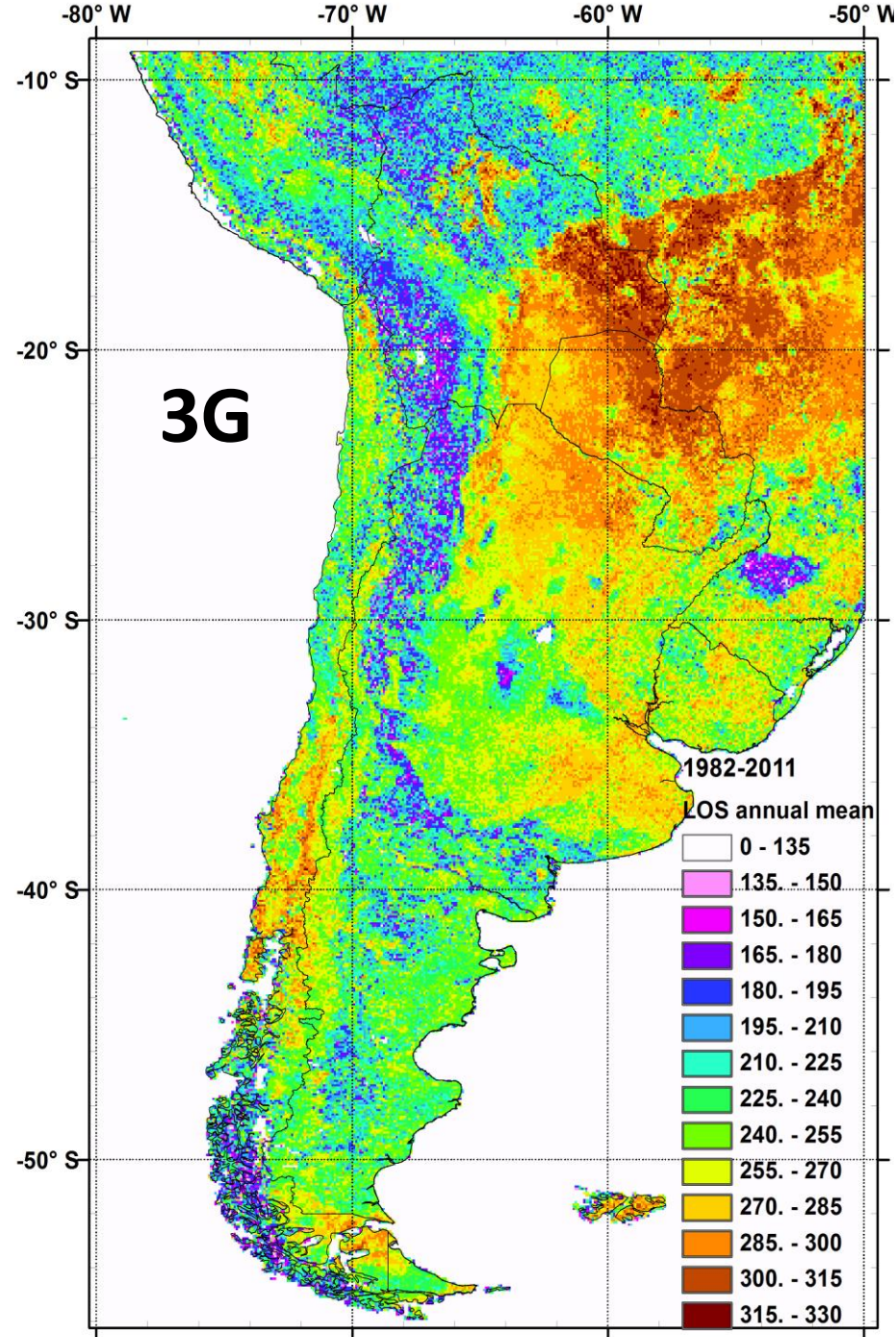
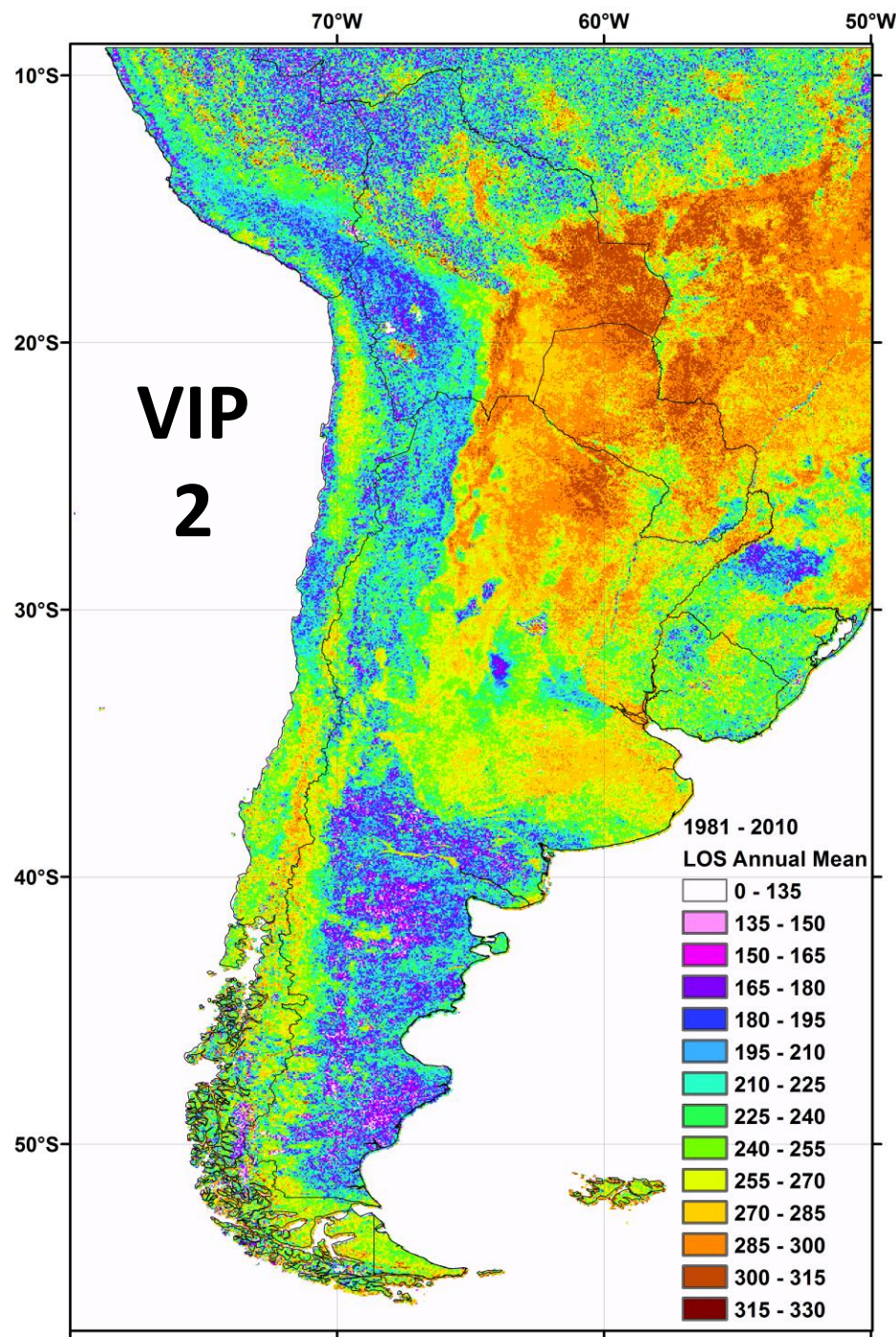


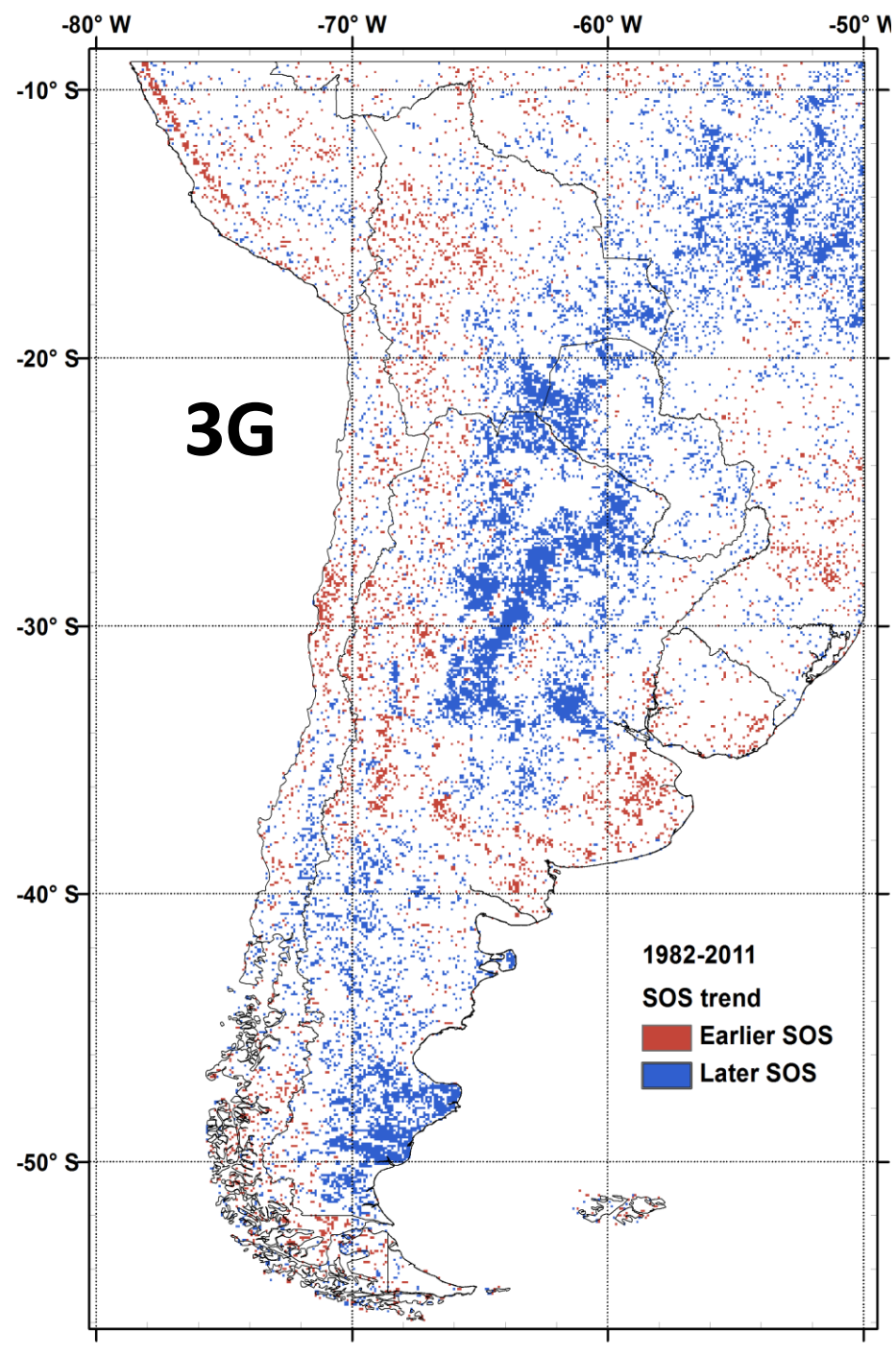
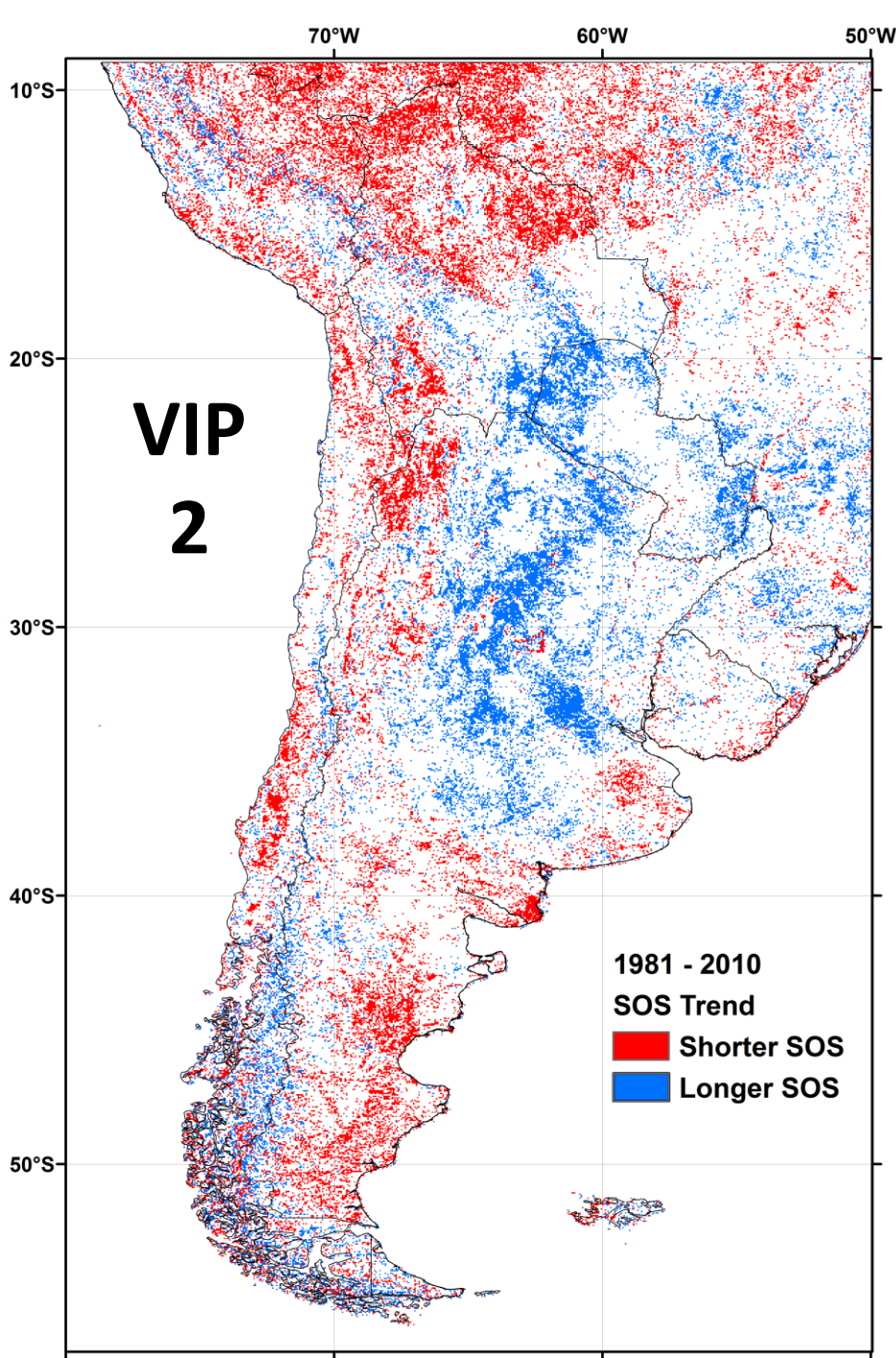


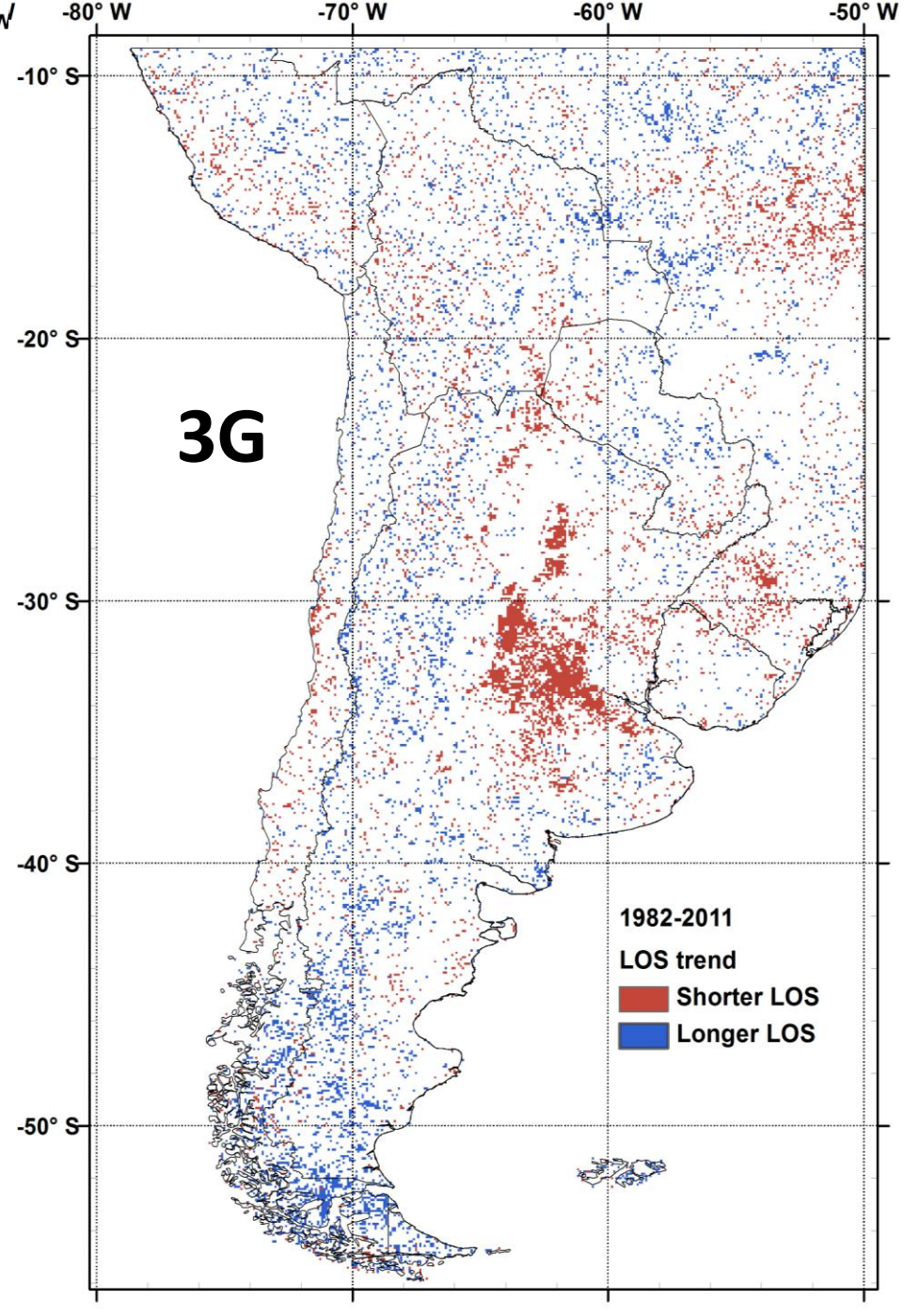
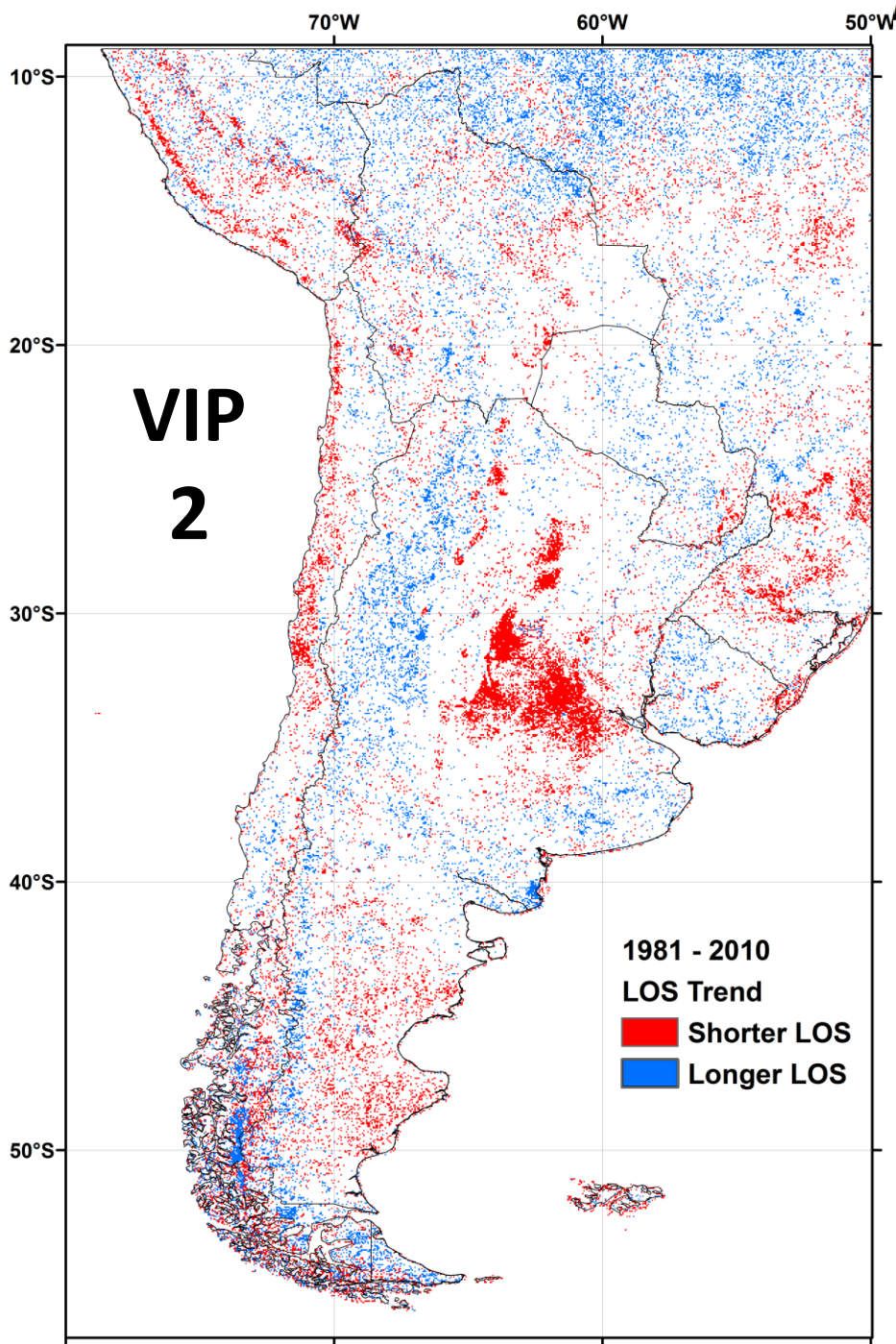


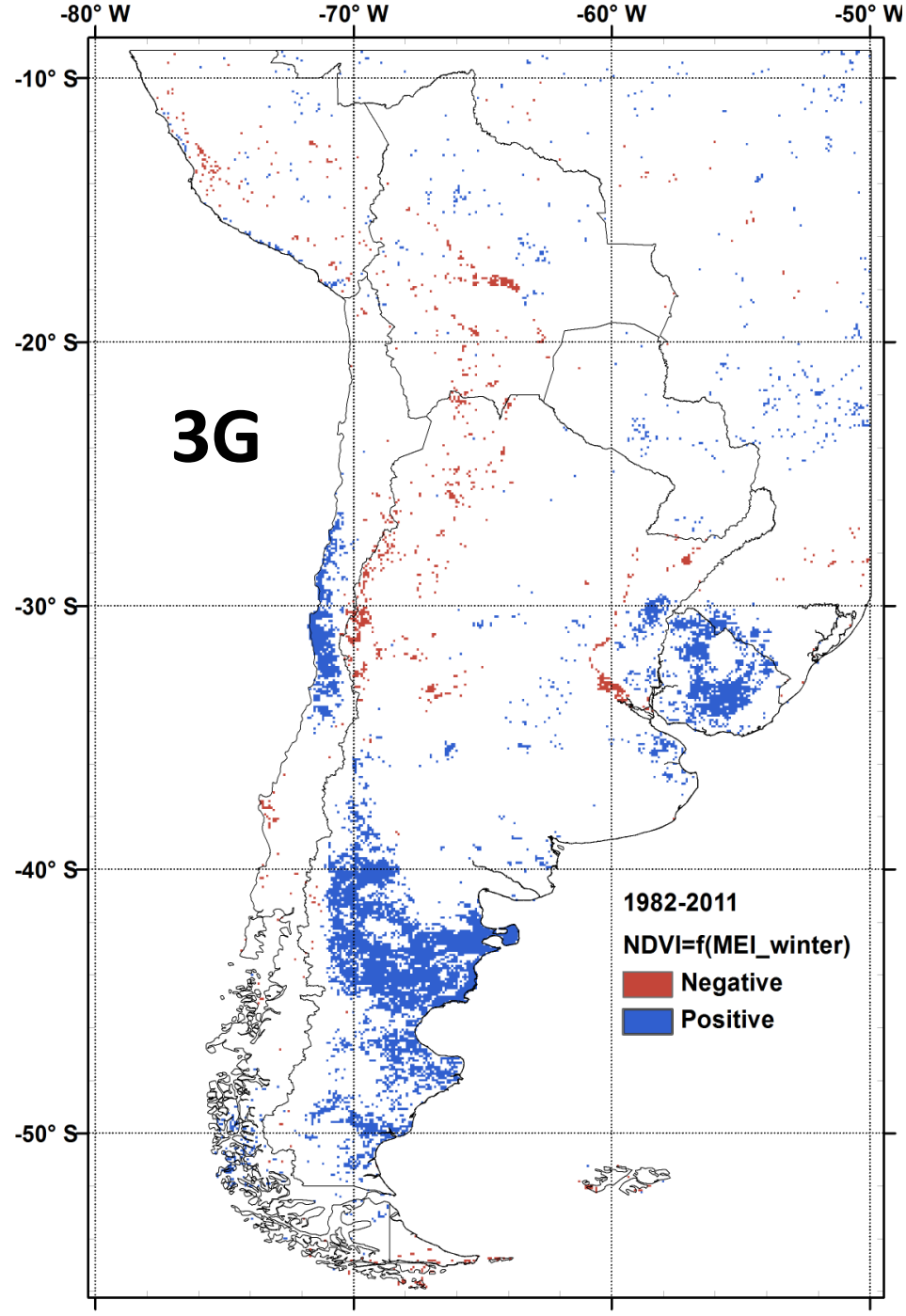
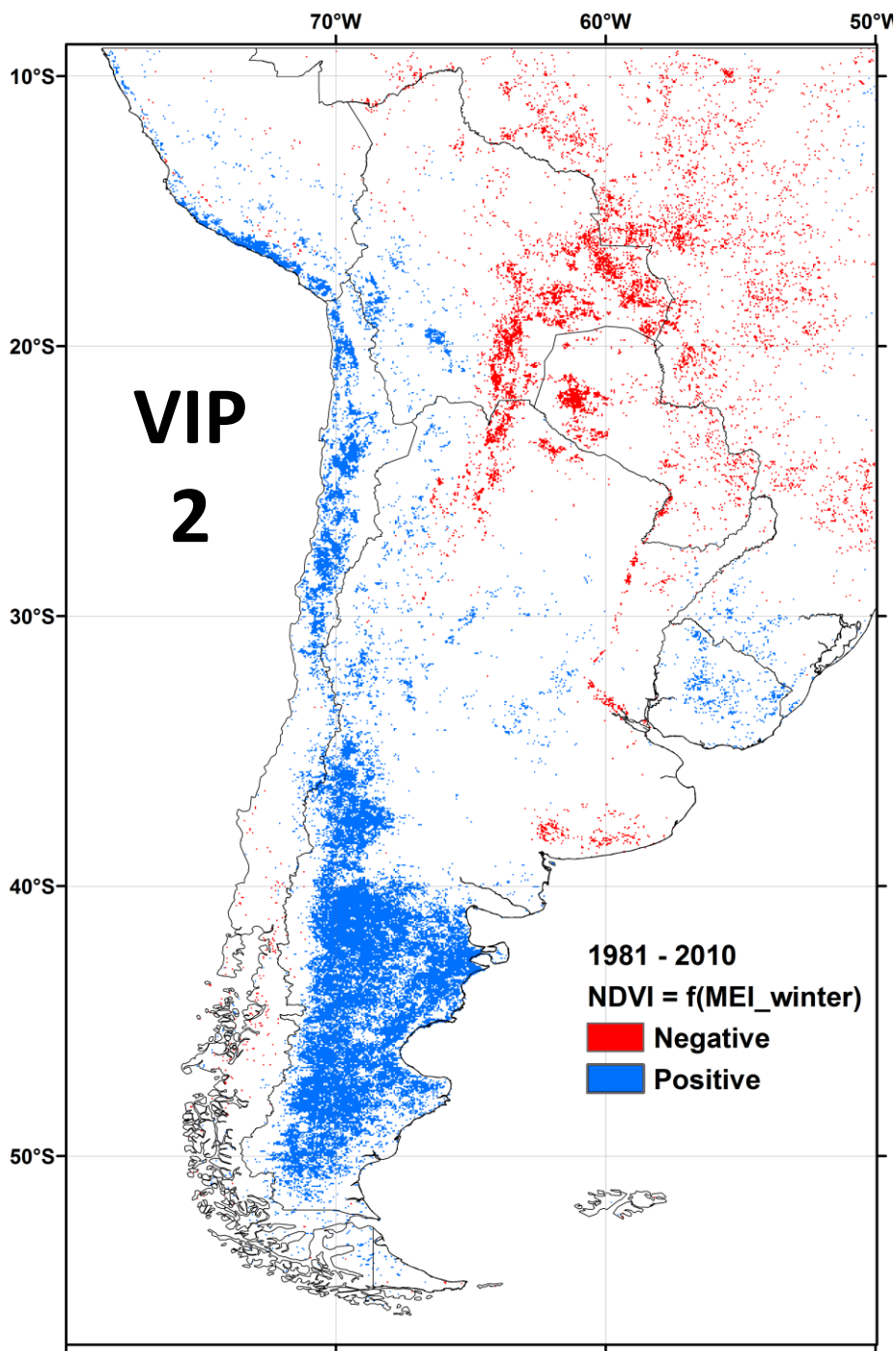


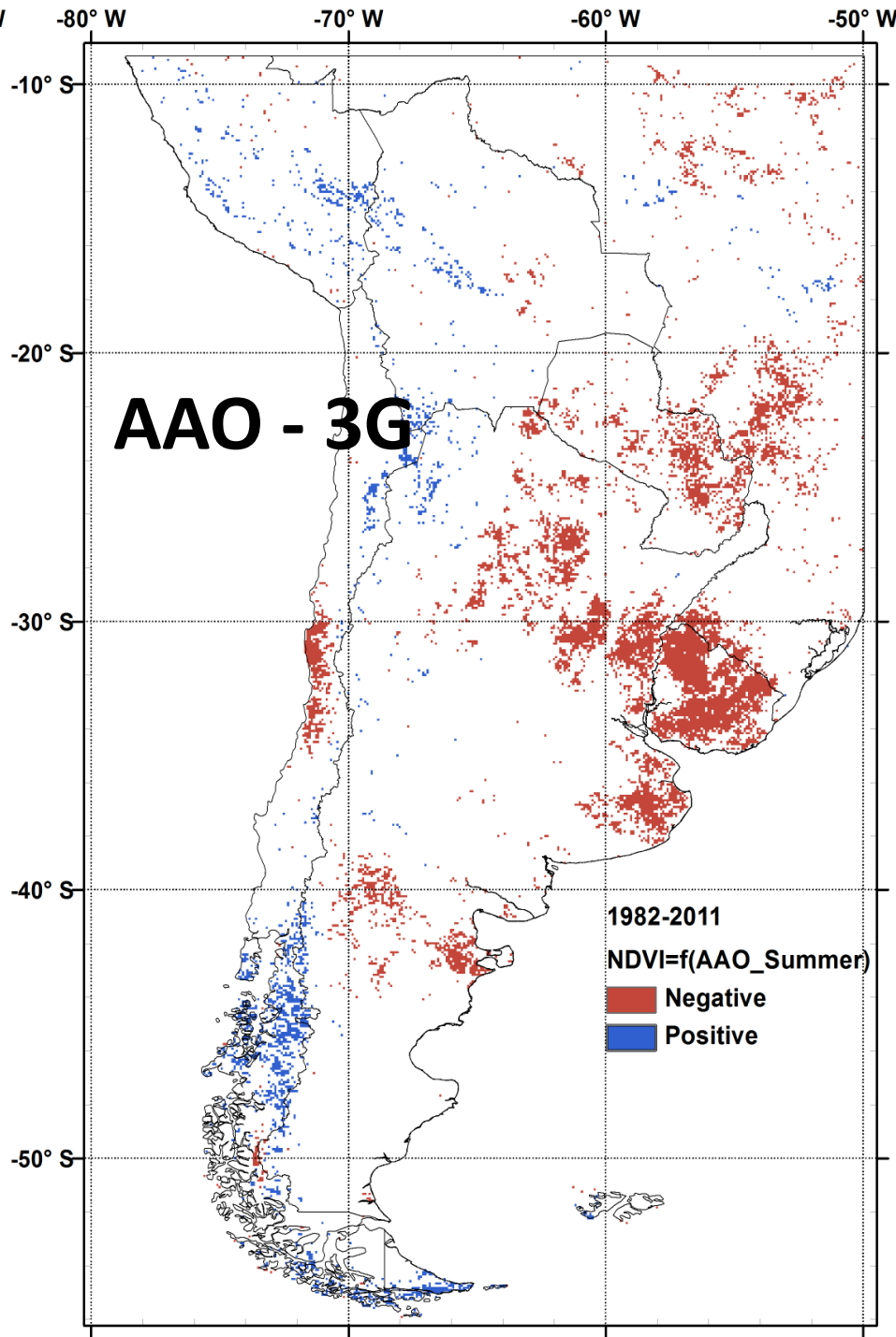
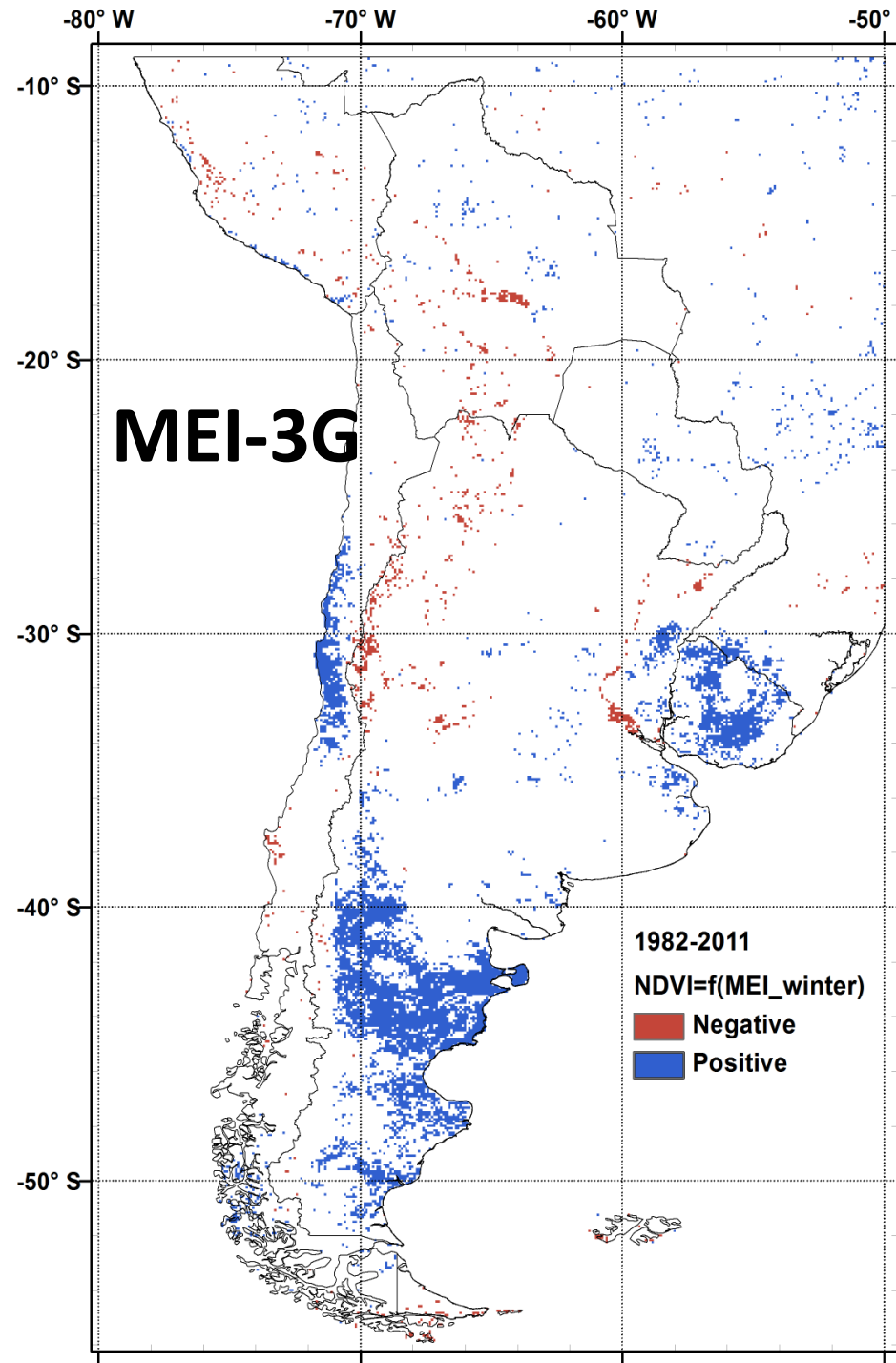


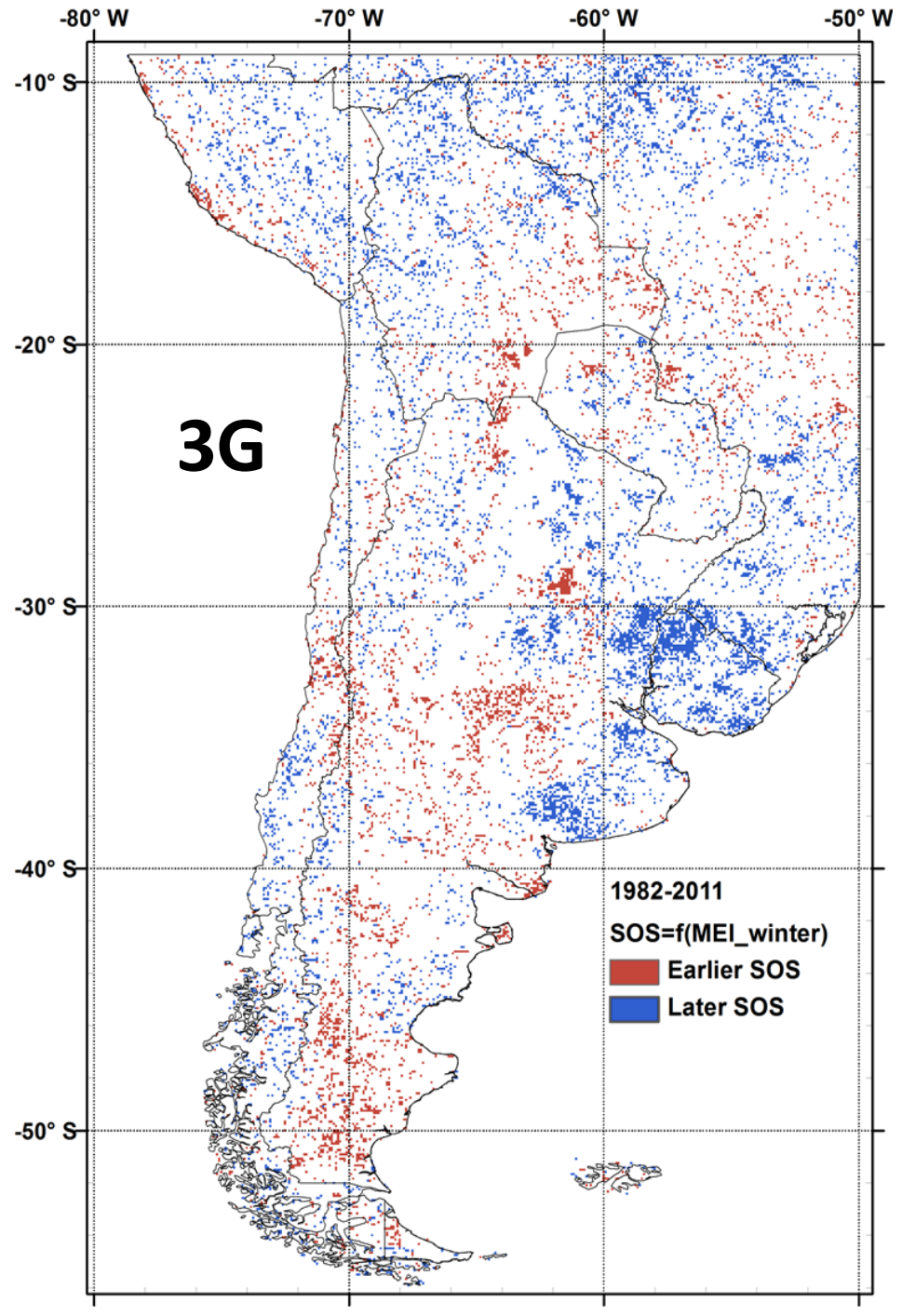
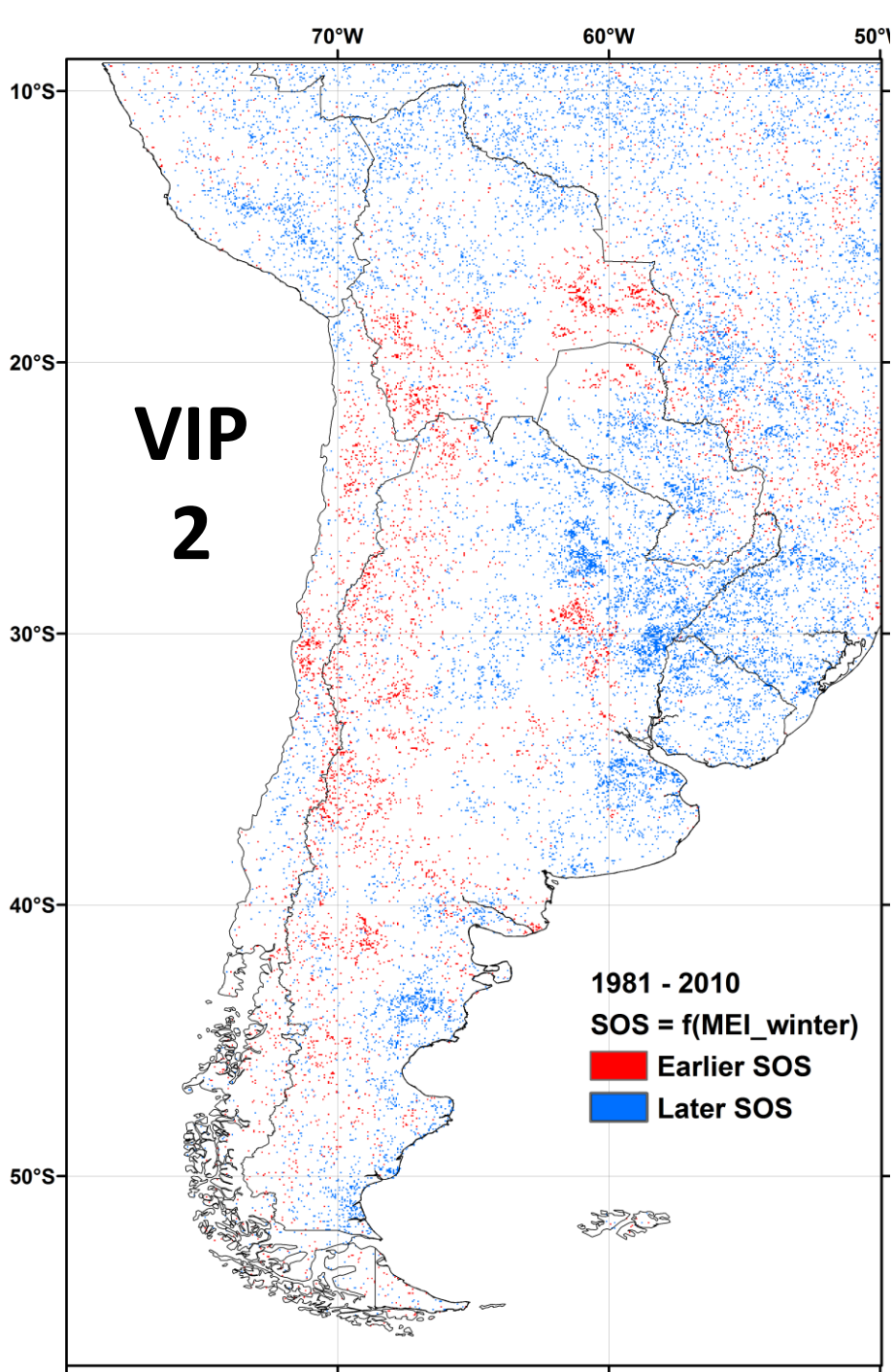












Preliminary Conclusions

- Large NDVI differences between VIP and 3g
- SOS and LOS patterns from VIP and 3g more similar
- Phenology and productivity trends are very different between VIP and 3g
- MEI and AAO impacts on productivity and phenology show different patterns between VIP and 3g