

Assessment of drought index response to change in forest cover across different climate zones

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What is the influence of forest fraction variability on droughts for different time scales and across different climate zones?

Data and method

➤ Precipitation and Temperature

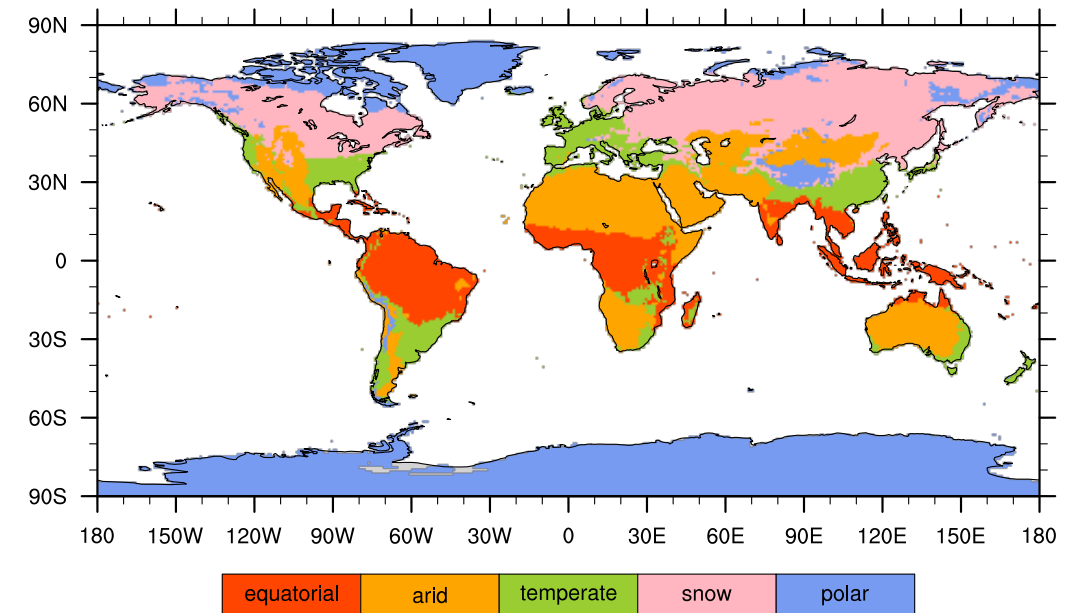
➤ Forest Cover

➤ Drought Indices

- The Standardized Precipitation Evapotranspiration Index (SPEI) (spei03, spei06, spei12, spei24)
- The self-calibrating Palmer Drought Severity Index (scPDSI)

➤ Climate Classification

- the latest digital Köppen-Geiger World map data



Data and method

➤ Linear Model & ANOVA

regression equation in model notation
(McCullagh and Nelder, 1989)

$$D_T \sim \text{forest} + \text{precip} + \text{temp} + \\ \text{forest}:\text{precip} + \text{forest}:\text{temp} + \\ \text{precip}:\text{temp}$$

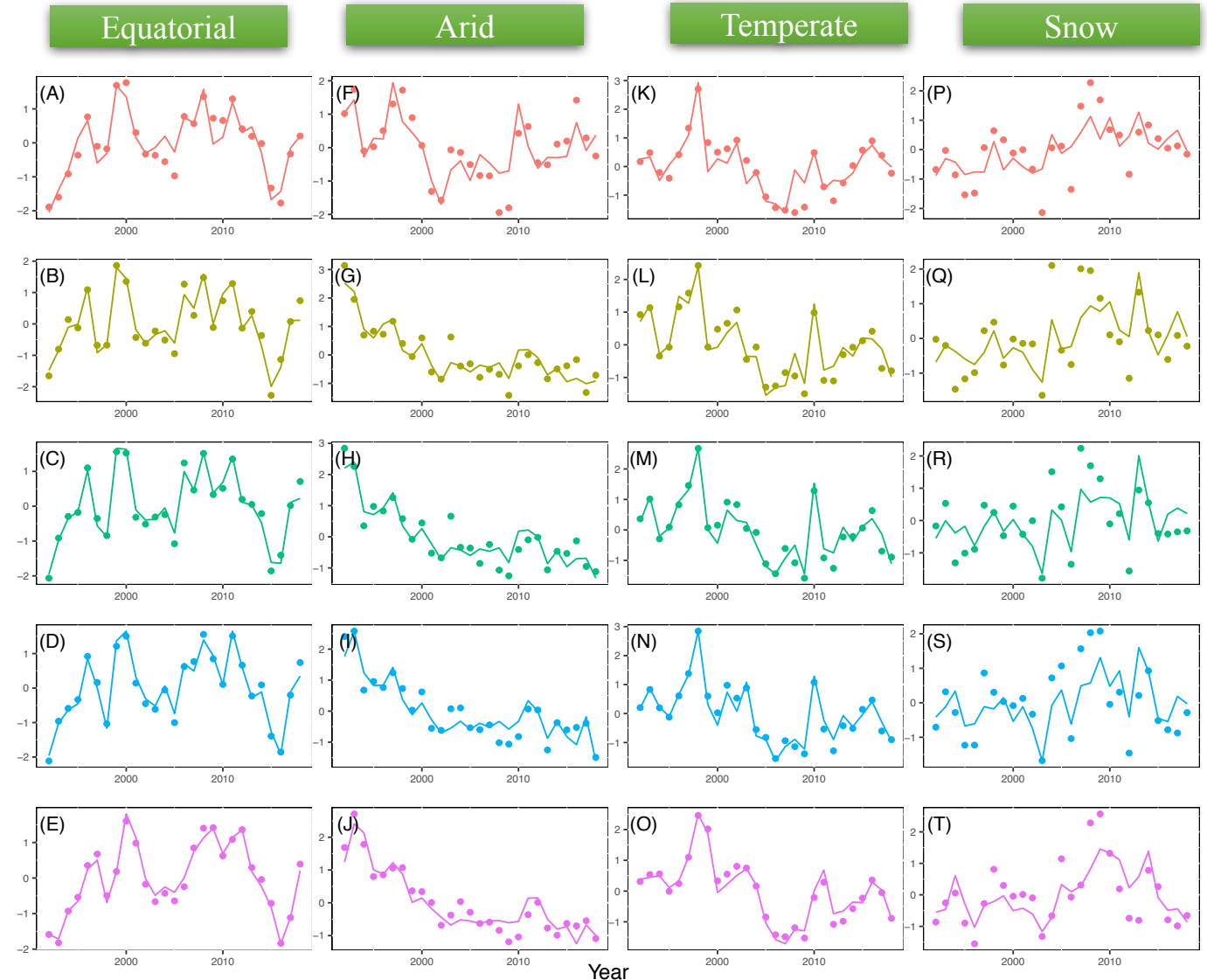
scPDSI

spei03

spei06

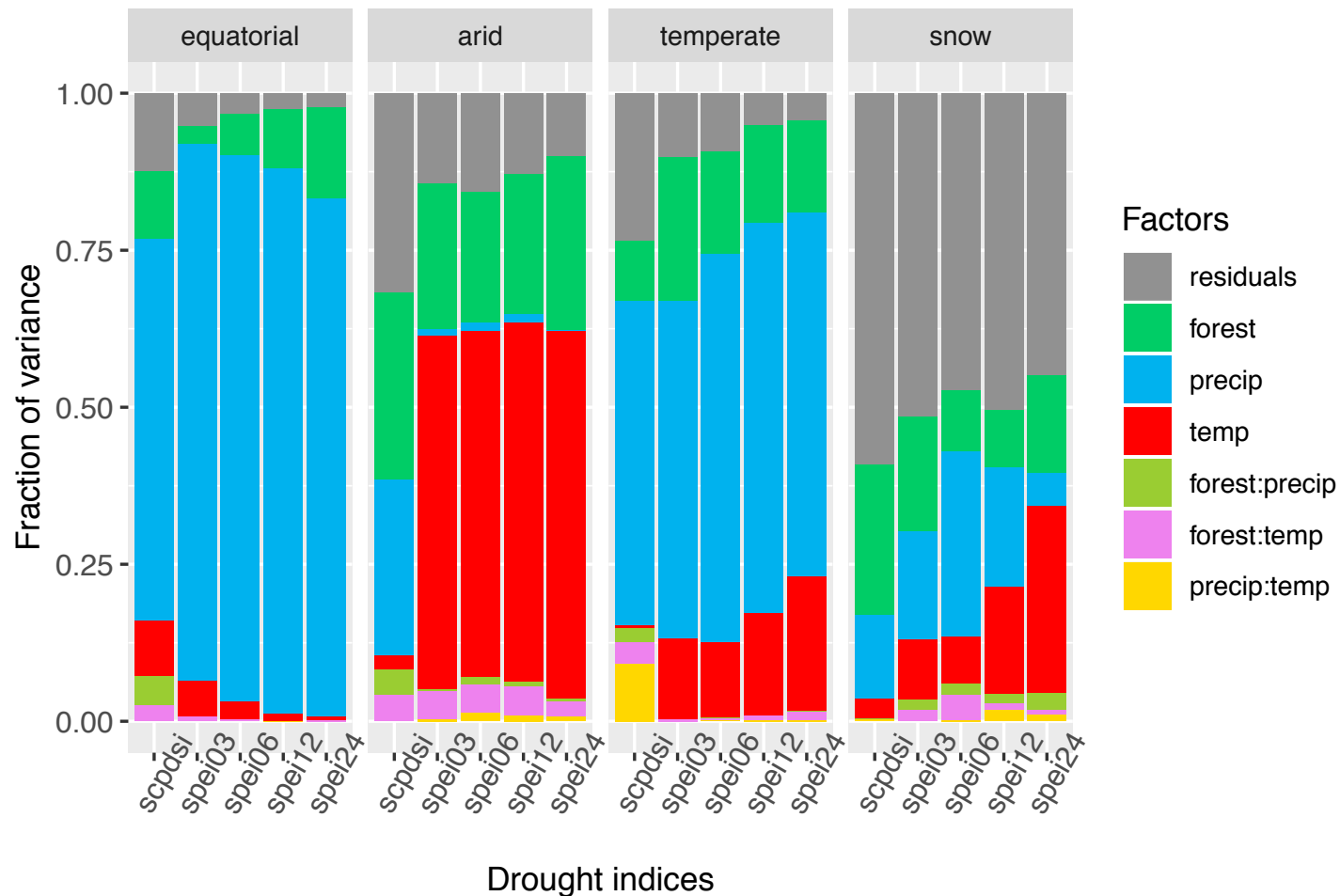
spei12

spei24



Results

Variance described by forest cover change



- latitudinal pattern
- meteorological factors



short-term droughts

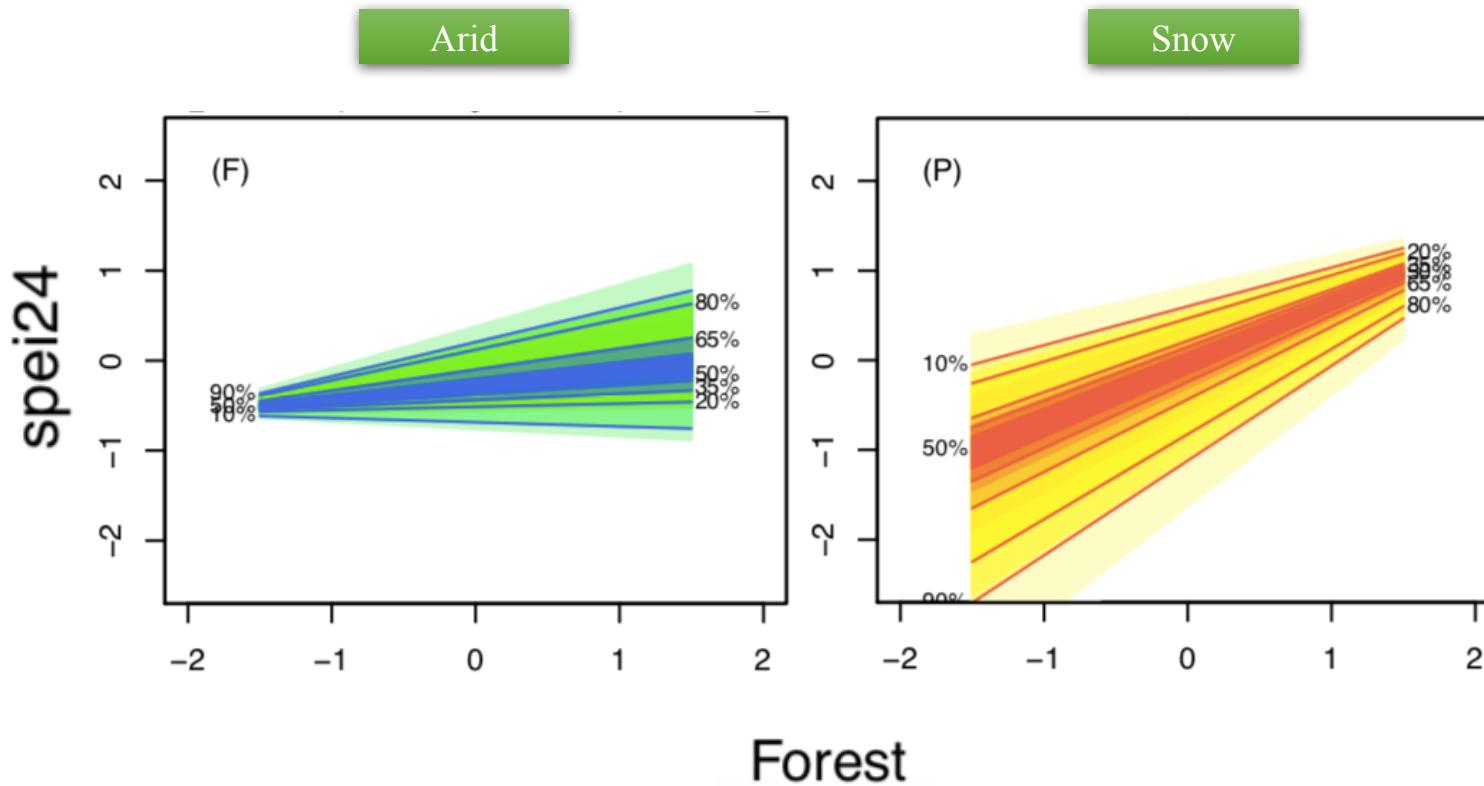
forests



long-term droughts.

Results

Fan chart for the effect of forest cover to droughts based on the linear model



- Arid: afforestation
↓
impacts of precipitation
- Snow: deforestation
↓
impacts of temperature

Thank you!