



## Trend patterns in global sea surface temperature

**S. M. Barbosa** (1), O. B. Andersen (2)

(1) Universidade Porto, Faculdade Ciencias, Dpt Matematica Aplicada  
(susana.barbosa@fc.up.pt), (2) Danish National Space Center, DTU

Isolating long-term trend in sea surface temperature (SST) from ENSO variability is fundamental for climate studies. In this work, a robust space-time multivariate method is applied to isolate low-frequency and ENSO variability from satellite-based time series of SST anomalies. Trend patterns are extracted using trend-EOF analysis, a technique based on a nonlinear inverse-rank extension to traditional EOF analysis. The first derived trend pattern reflects low-frequency variability characterised by a systematic decrease in SST in the equatorial Pacific and an increase in most of the global ocean, while the second trend pattern reflects ENSO variability in the Pacific Ocean. The examination of the contribution of these two modes to the globally-averaged SST fluctuations indicates that they are able to account for most ( $> 90\%$ ) of the variability observed in global mean SST. Trend-EOFs perform better than conventional EOFs when the interest is on low-frequency rather than on maximum variance patterns, particularly for short time series such as the ones resulting from satellite retrievals.