Fire activity in Equatorial Asia related to the El Niño diversity

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Field et al. (2016) *PNAS*

Precipitation

Fire
According to a 2016 study, the haze caused more than 100,000 additional deaths, most of them (> 90,000) in Indonesia

Koplitz et al. (2016) ERL
The effects of fire on carbon cycle

Global:

$2.01 \pm 1.1 \text{ PgC yr}^{-1}$ (cf. Fossil fuels$_{2000-2008}$: 7.7 PgC yr$^{-1}$)

Grace et al. (2014) GCB

The largest variability

(a) Carbon emission by fire (PgC/yr)

(b) Equatorial Asia burned area (Kha)

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Teleconnection on the equatorial Asian Fire

El Niño

Positive Indian Ocean Dipole (IOD)

Dry condition

Equatorial Asia Fire

Field et al. (2009) *Nature Geoscience*
Research Motivation

The biggest diversity in Oct (Oct is time for changing from dry to wet season)

Q. What happened in Oct?
Local SST over Southern Hemisphere equatorial Asia

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Local Sea Surface Temperature Anomalies

Enhanced Wind speed – more Evaporation – SST cooling (WES)

Kida & Richards (2009) JGR

SST

Wind speed
Role of Local SST on Equatorial Asia fire

Q. What in Oct?

- August: 1.86
- September: 2.61
- October: 3.61
- November: 4.14
- December: 1.38

Southern Hemisphere equatorial Asia

Reg. Coeff.

Precipitation (mm d⁻¹)

SST (°C)
Conclusion

Local SST’s role

16% of RMS error reduced in El Niño cases

(HELPFUL FOR THE WILDFIRE PREDICTION)
Extensive fires in southeastern Siberian permafrost linked to preceding Arctic Oscillation

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