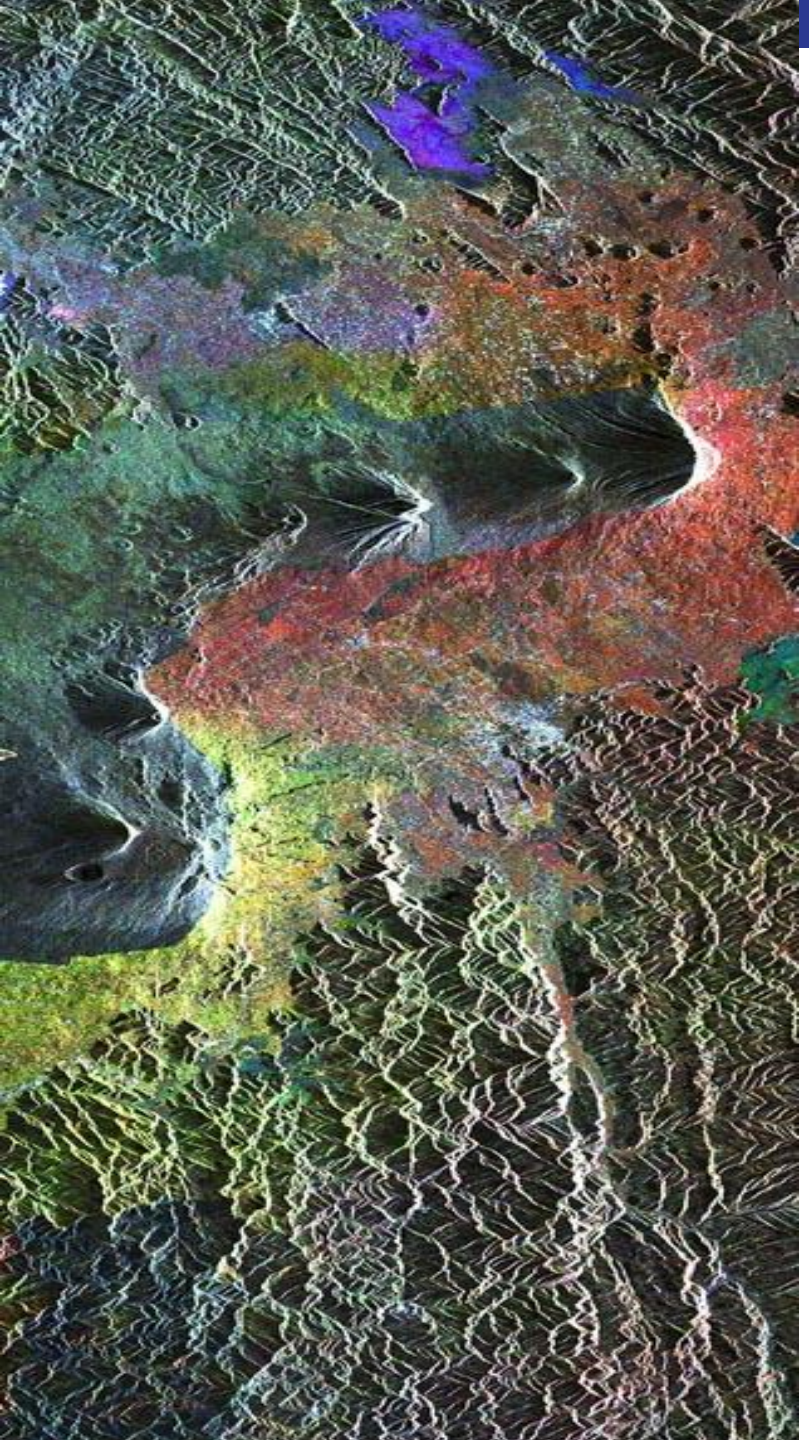


Fire activity in Equatorial Asia related to the El Niño diversity

Jin-Soo Kim[1,2], Su-Jong Jeong[3], Jong-Seong Kug[4], Mathew Williams[1,2]

[1]School of GeoSciences, University of Edinburgh
[2]**National Centre for Earth Observation**, University of Edinburgh
[3]Seoul National University, South Korea
[4]Pohang University of Science and Technology, South Korea

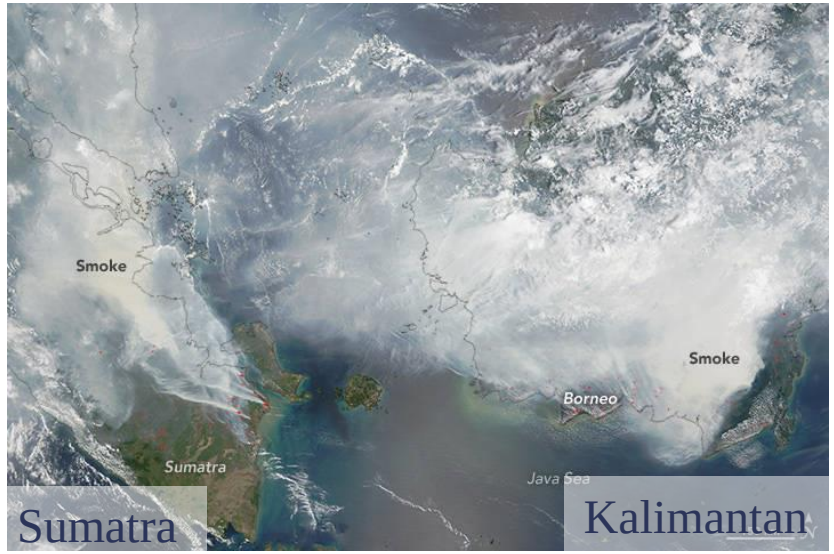
Under revision (*Geophysical Research Letter*)

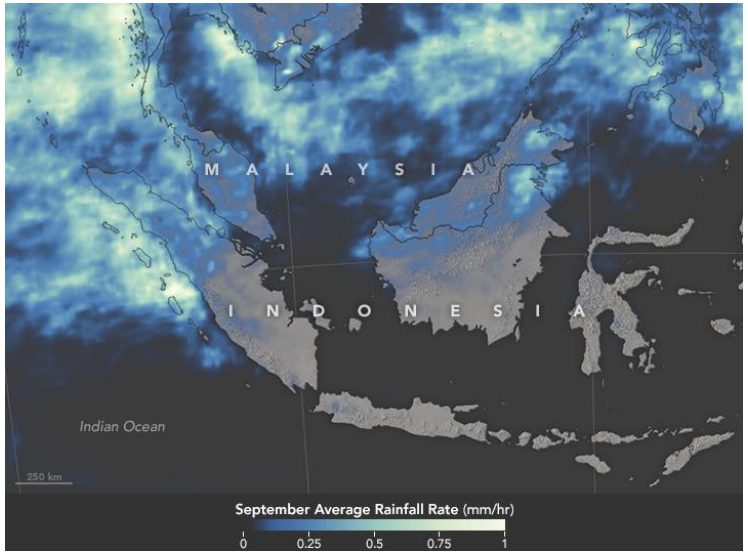
THE UNIVERSITY *of* EDINBURGH
School of GeoSciences

Forests 2020

UK SPACE AGENCY

September 2015

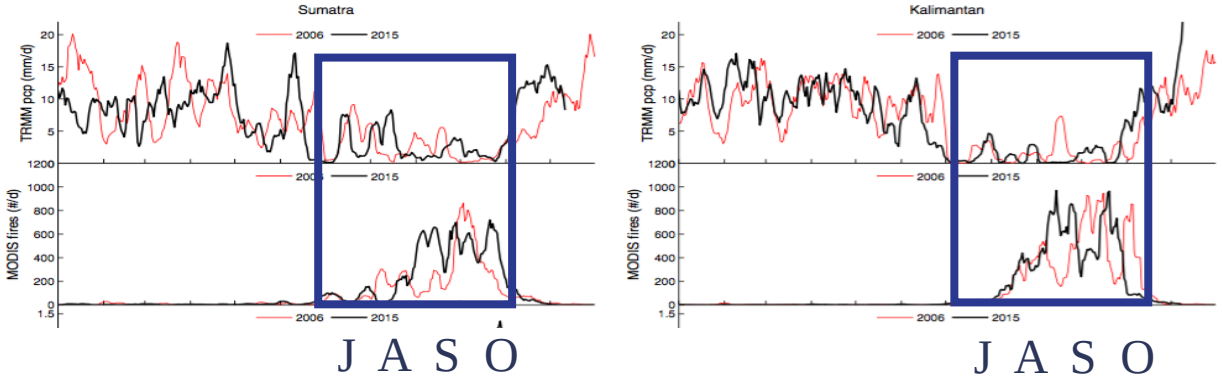




http://www.nasa.gov/feature/goddard/2016/el-nino-brought-drought-and-fire-to-indonesia

Precipitation

Fire



Field et al. (2016) *PNAS*

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*

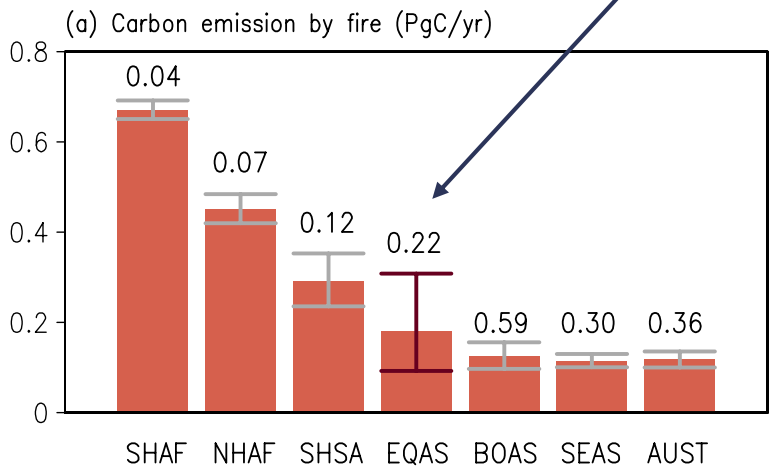
The effects of fire on carbon cycle

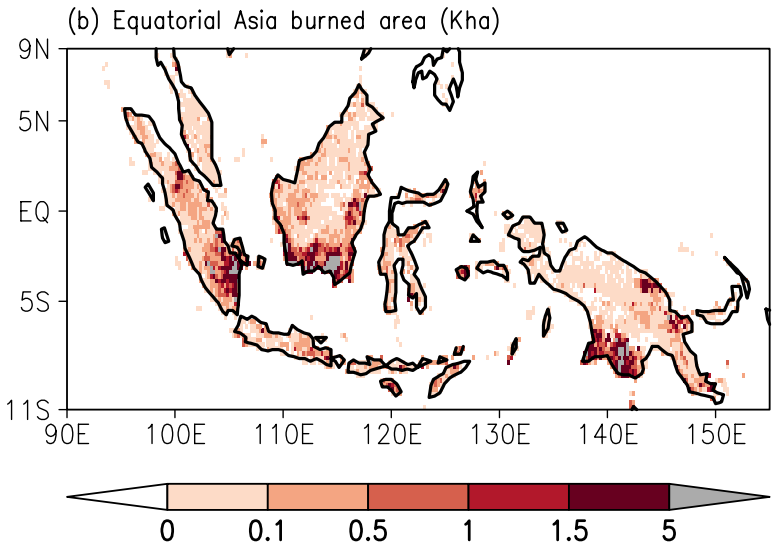
Global:

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

Grace et al. (2014) GCB

The largest variability





BONA Boreal North America
TENA Temperate North America
CEAM Central America
NHSA Northern Hemisphere South America
SHSA Southern Hemisphere South America
EURO Europe
MIDE Middle East
NHAF Northern Hemisphere Africa
SHAF Southern Hemisphere Africa
BOAS Boreal Asia
CEAS Central Asia
SEAS Southeast Asia
EQAS Equatorial Asia
AUST Australia and New Zealand

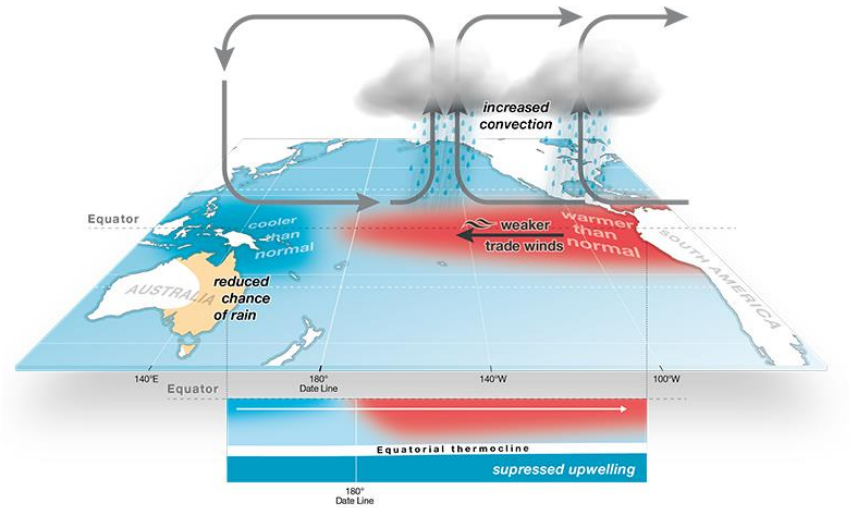
National Centre for Earth Observation
NATURAL ENVIRONMENT RESEARCH COUNCIL

Jin-Soo Kim | Jinsoo.Kim@ed.ac.uk | University of Edinburgh

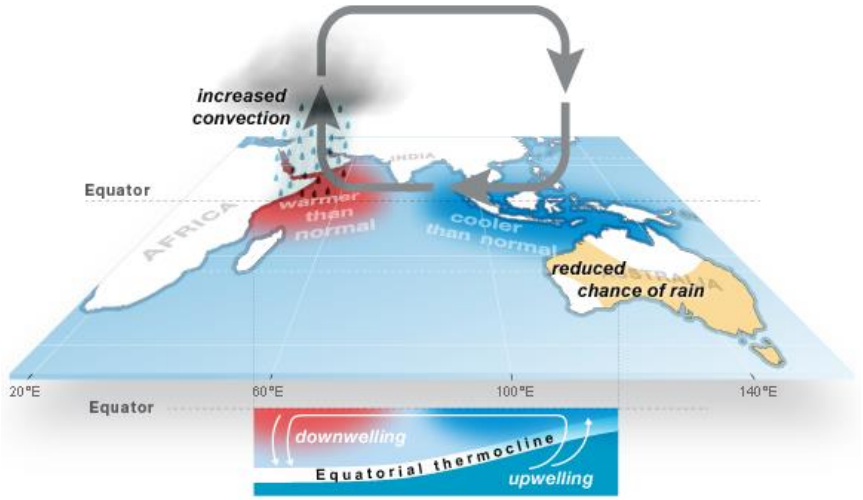
NERC SCIENCE OF THE ENVIRONMENT

Teleconnection on the equatorial Asian Fire

El Niño



Positive Indian Ocean Dipole (IOD)

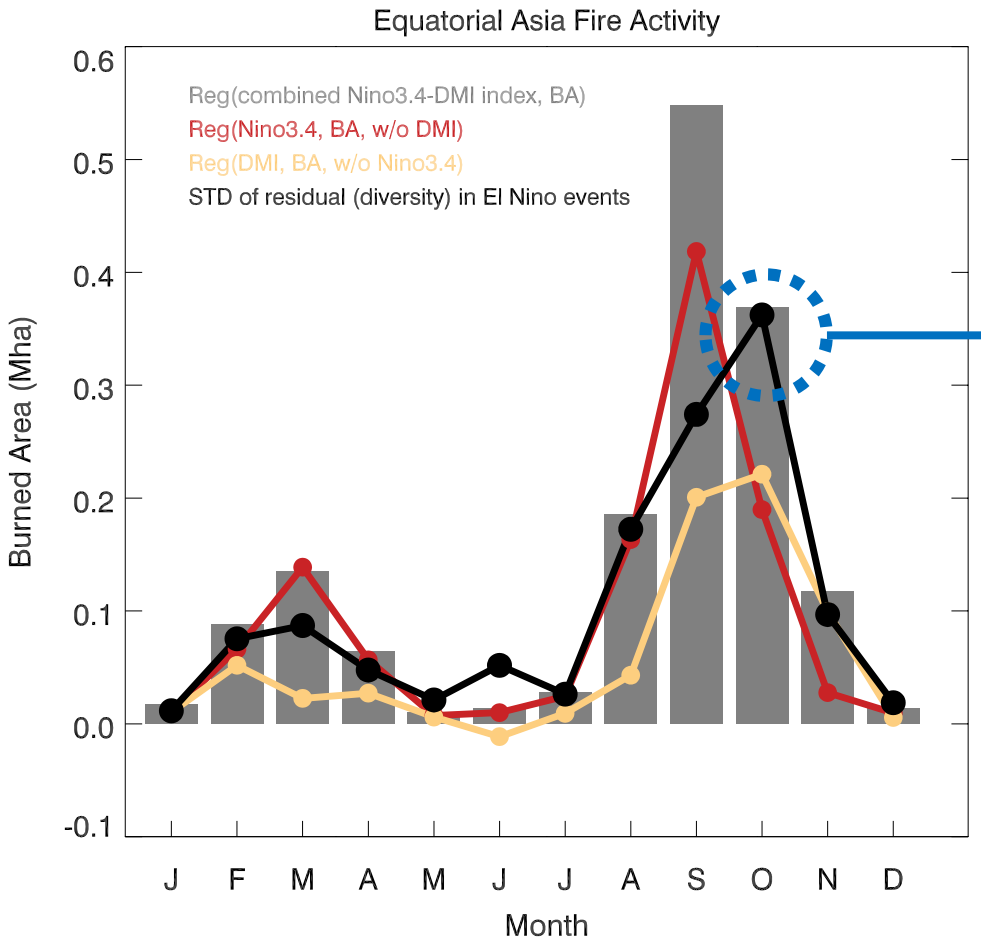


Dry condition

Equatorial Asia Fire

Field et al. (2009) *Nature Geoscience*

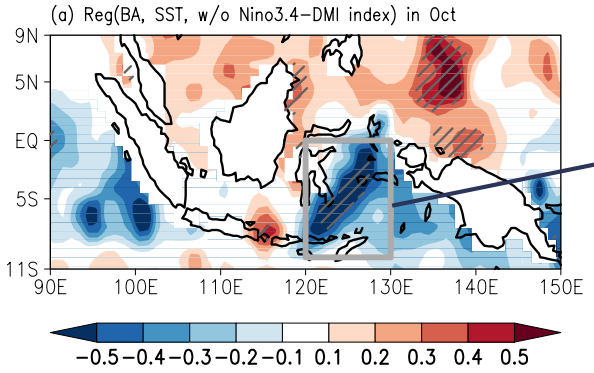
Research Motivation



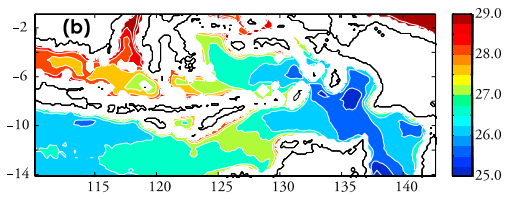
The biggest diversity in Oct
(Oct is time for changing
from
dry to wet season)

Q. What happened in Oct?

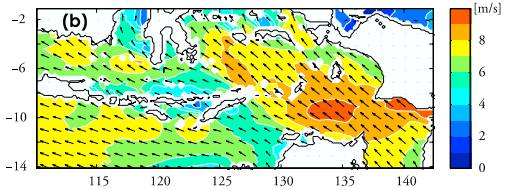
Local SST over Southern Hemisphere equatorial Asia



Local Sea Surface Temperature Anomalies

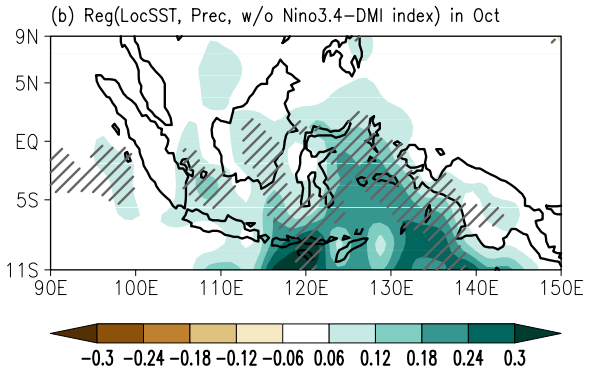


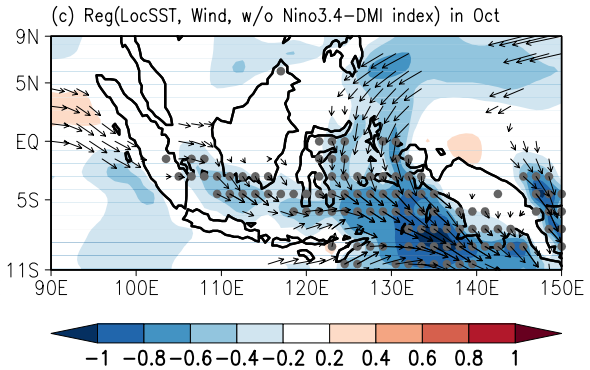
SST



Wind speed

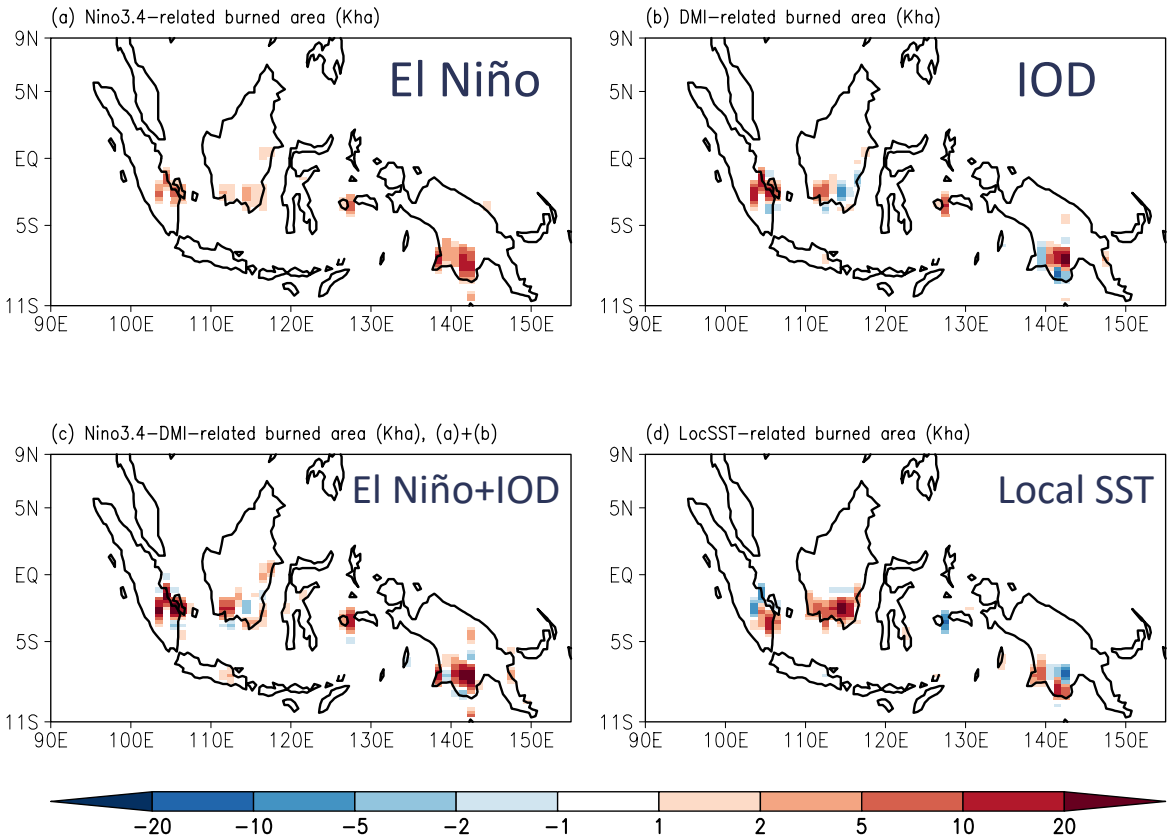
Kida & Richards (2009) *JGR*



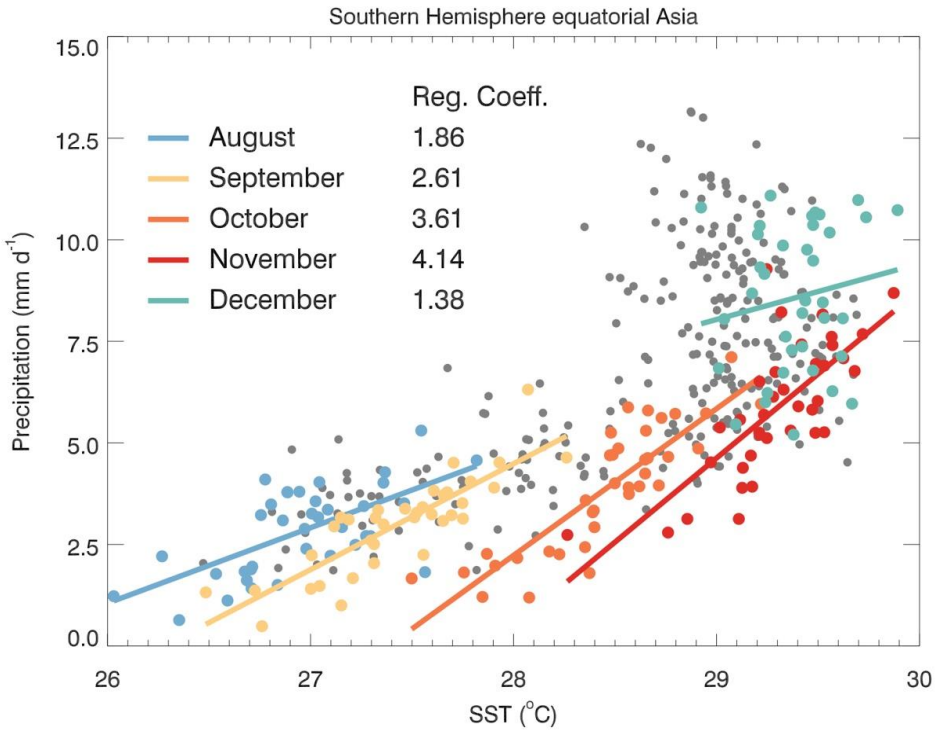


Enhanced **W**ind speed – more **E**vaporation – **S**ST cooling (**WES**)

Role of Local SST on Equatorial Asia fire

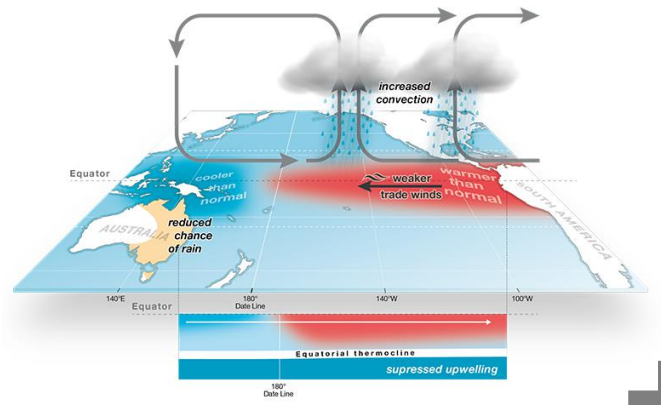


Q. What in Oct?



Conclusion

El Niño



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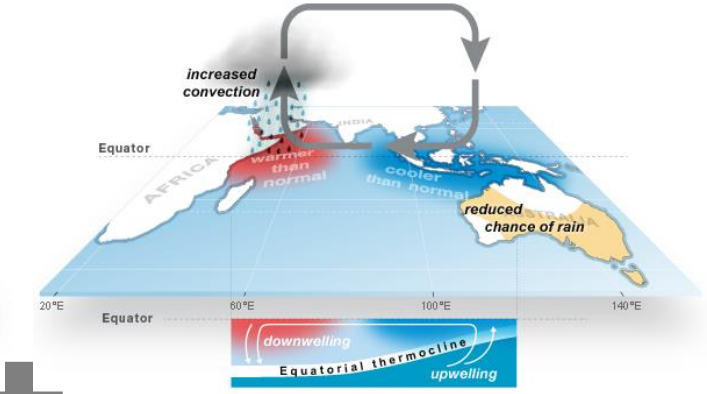
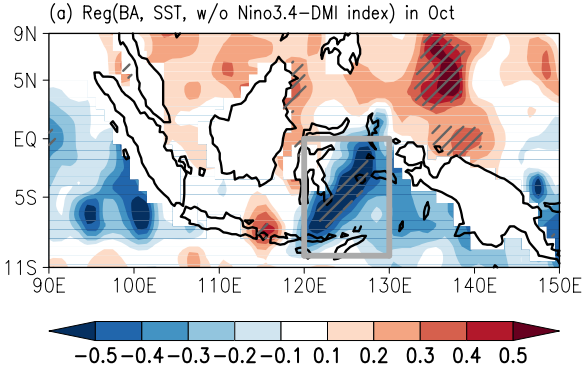


Local SST's role



16% of RMS error reduced in El Niño cases

(helpful for the wildfire prediction)

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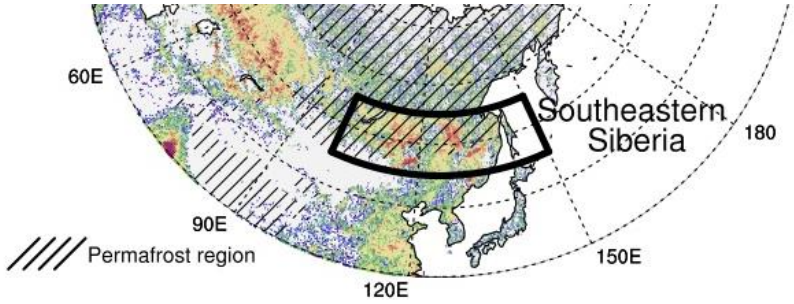
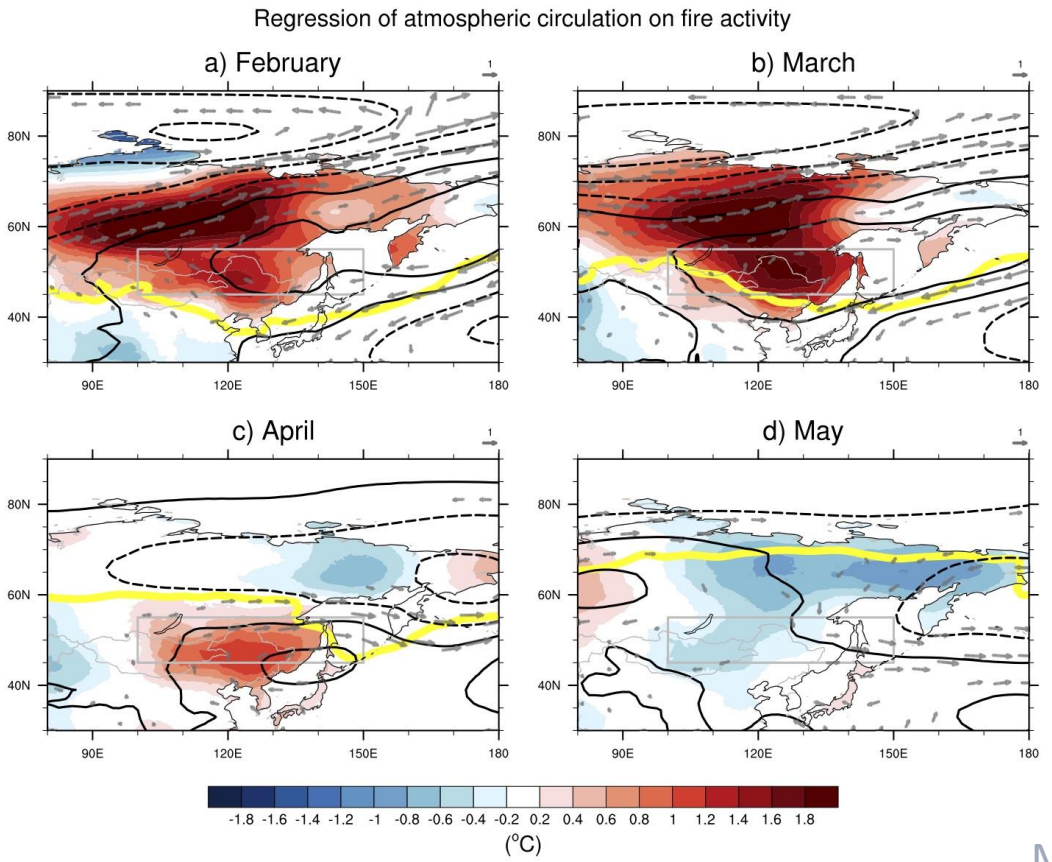
Extensive fires in southeastern Siberian permafrost linked to preceding Arctic Oscillation

Jin-Soo Kim[1,2], Jong-Seong Kug[3],
Su-Jong Jeong[4], Hotaek Park[5],
Gabriela Schaepman-Strub[6]

[1]School of GeoSciences, University of Edinburgh
[2]**National Centre for Earth Observation**, University of Edinburgh
[3]Pohang University of Science and Technology, South Korea
[4]Seoul National University, South Korea
[5]JAMSTEC, Japan
[6]University of Zurich, Switzerland





Minor revision
(*Science Advances*)