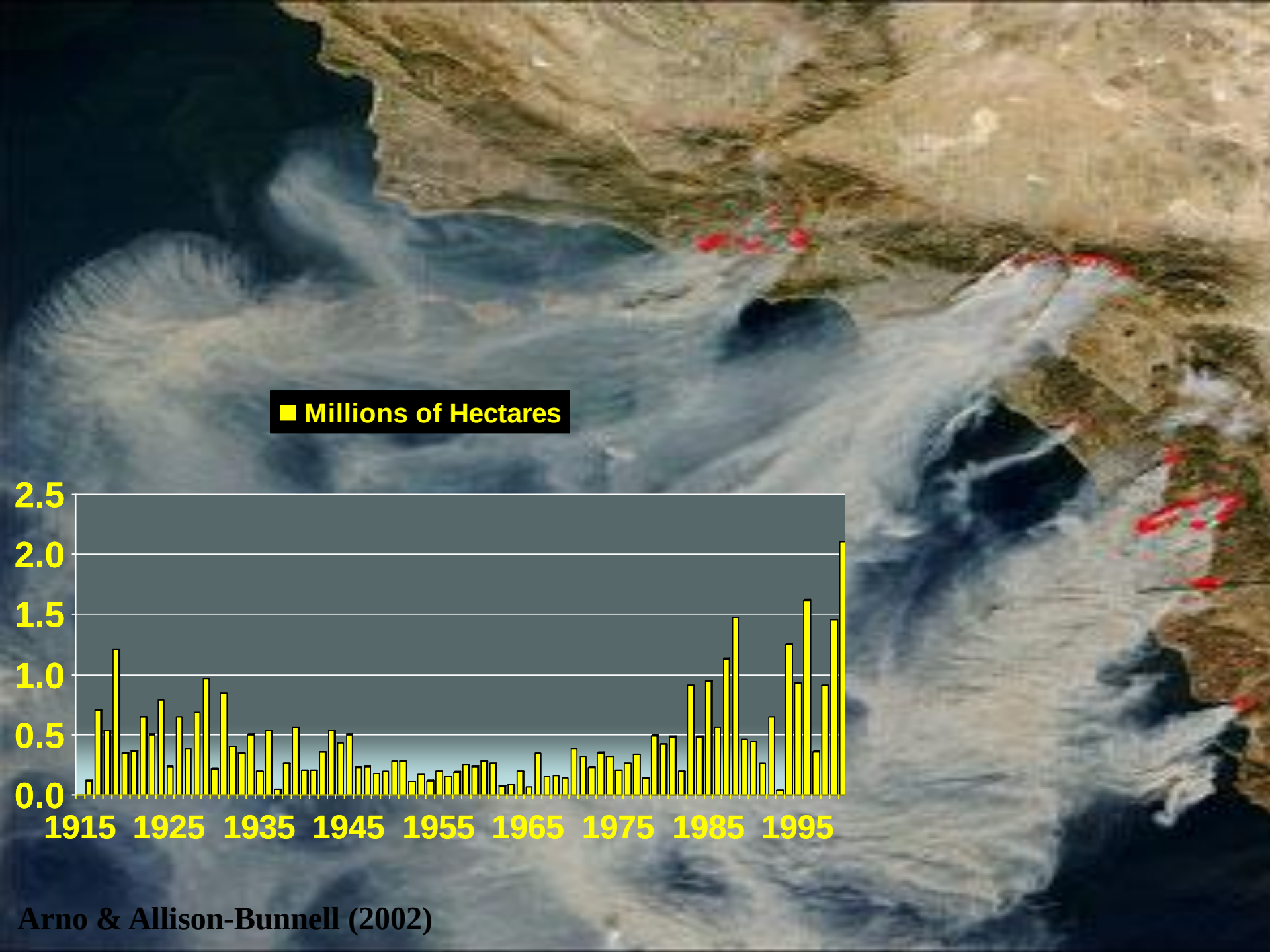
Large-scale interactions of climate, fire, and vegetation structure in the American West as observed through tree rings

Valérie Trouet

A. Taylor, E. Wahl, C. Skinner, S. Stephens

RISE symposium

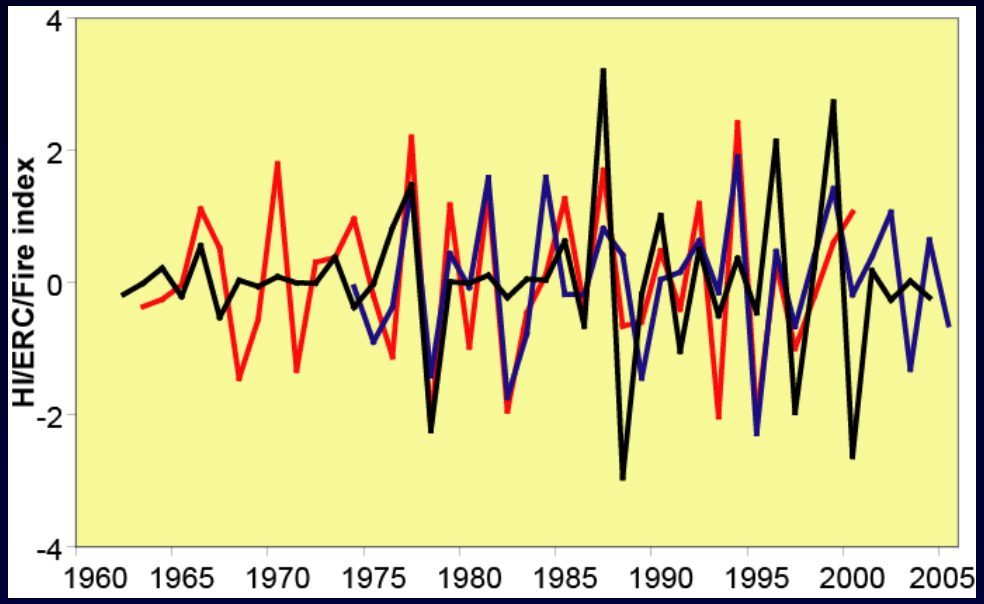
Tucson, 10.13.2012



Arno & Allison-Bunnell (2002)

20th C California fire weather

R=0.41; p<0.05



Trouet et al. (2008) TAC

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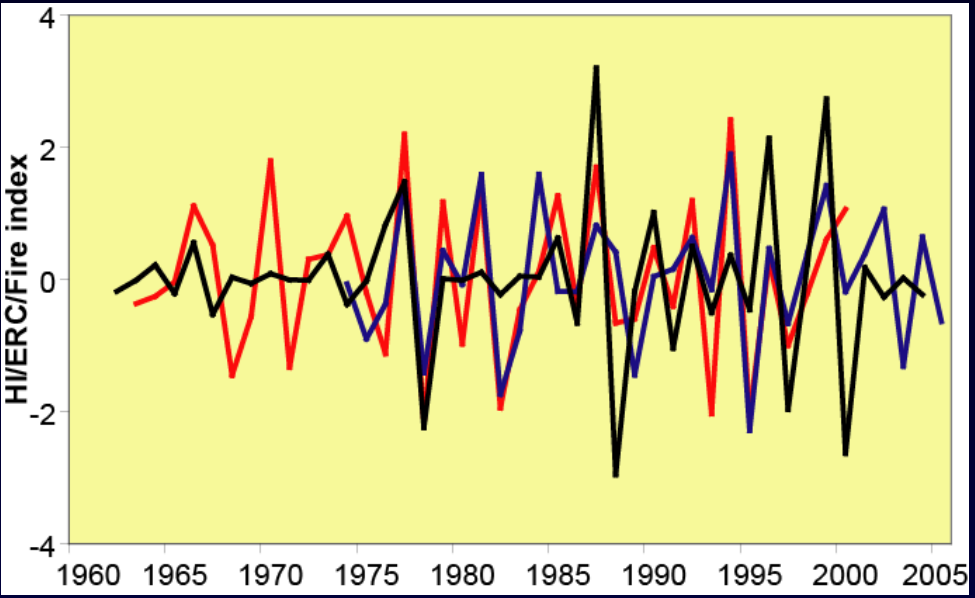
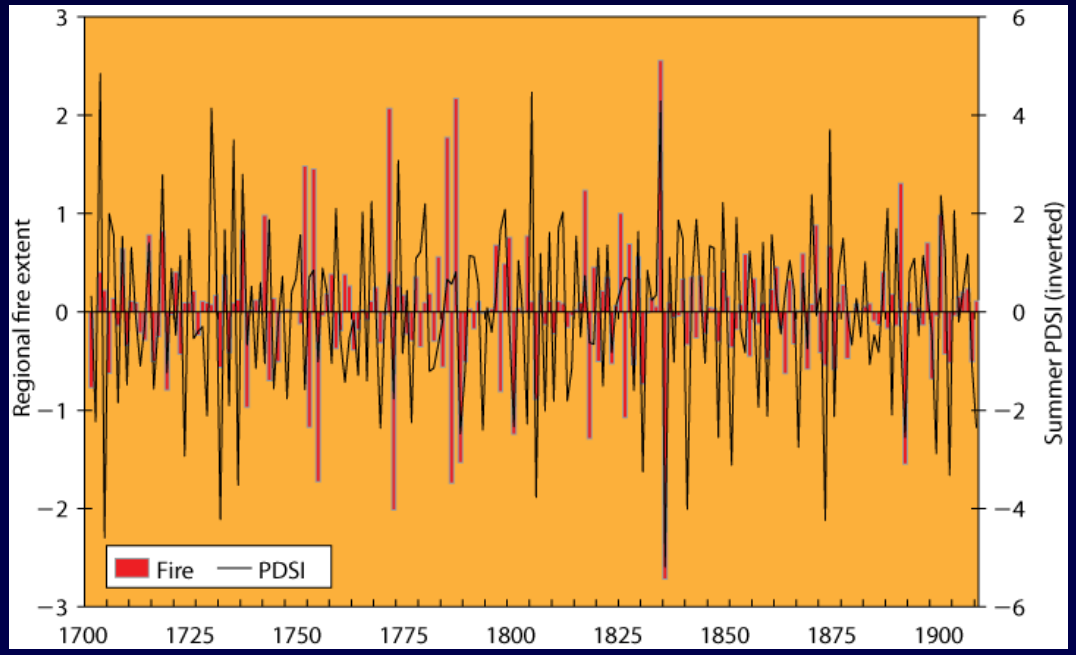
20th C California fire weather



r=0.41; p<0.05

1700-1900 N CA fire climate



r=0.356; p<0.001

Trouet et al. (2009) TAC

Taylor et al. (2008) IJWF

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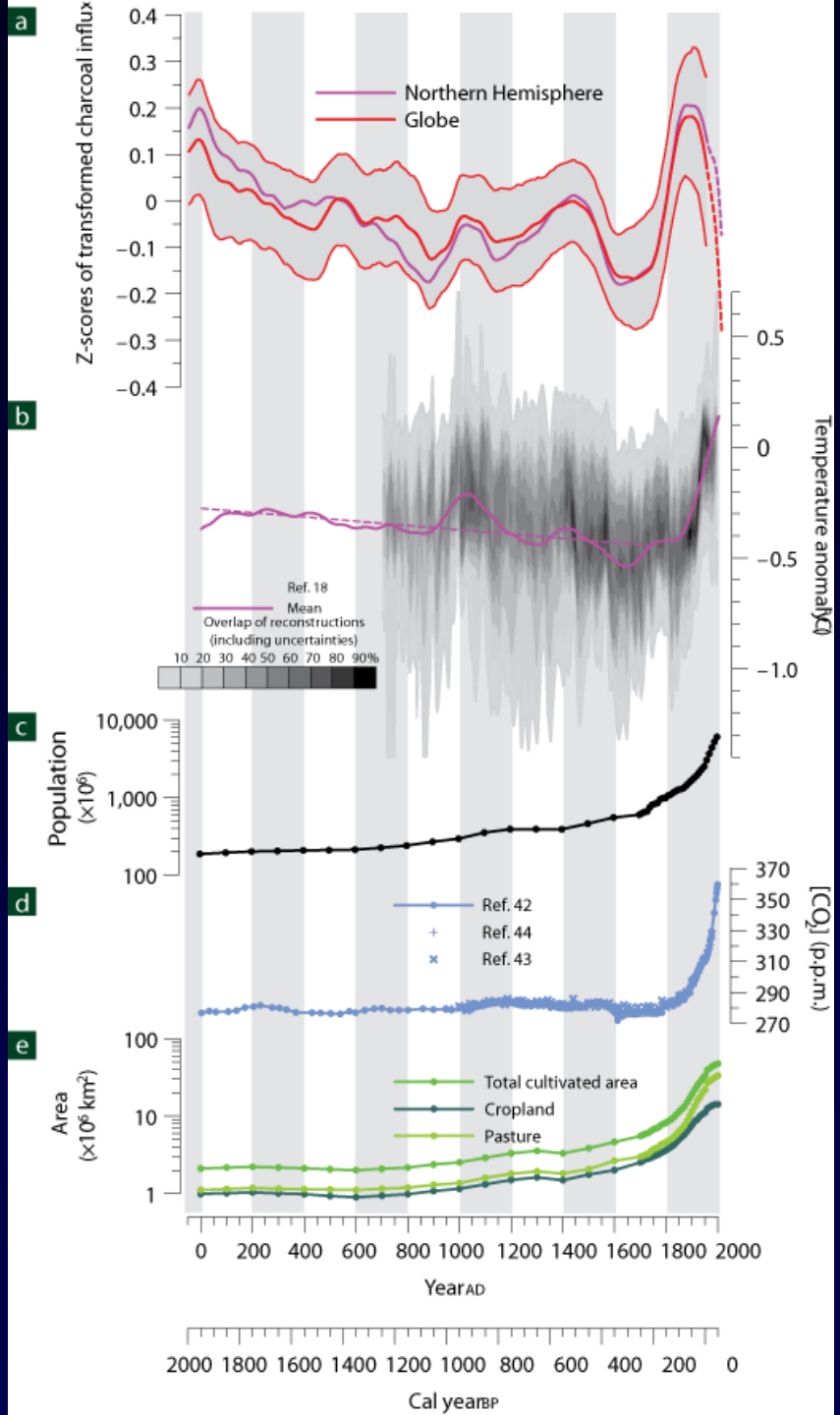
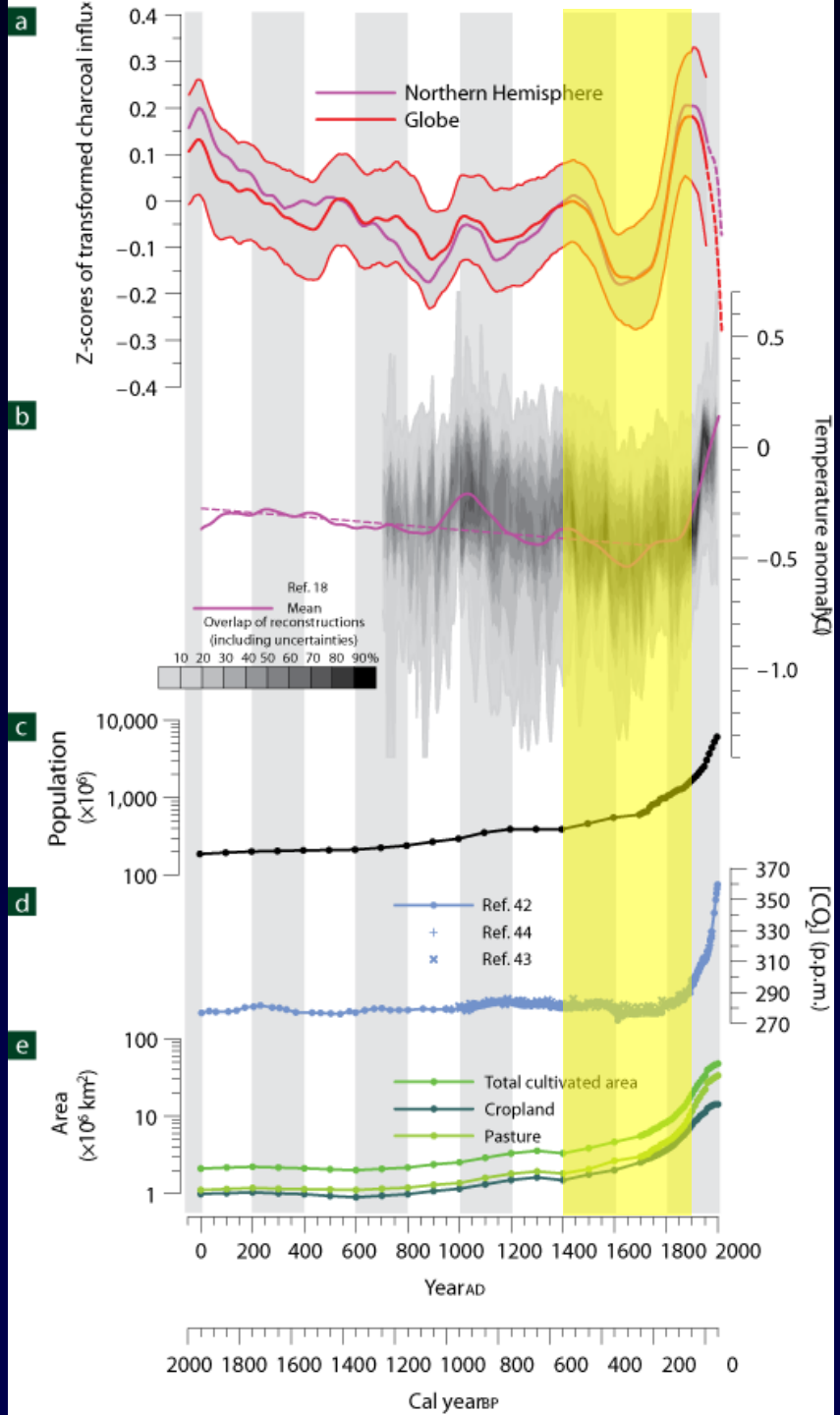


Marlon et al. (2008) Nature Geosc



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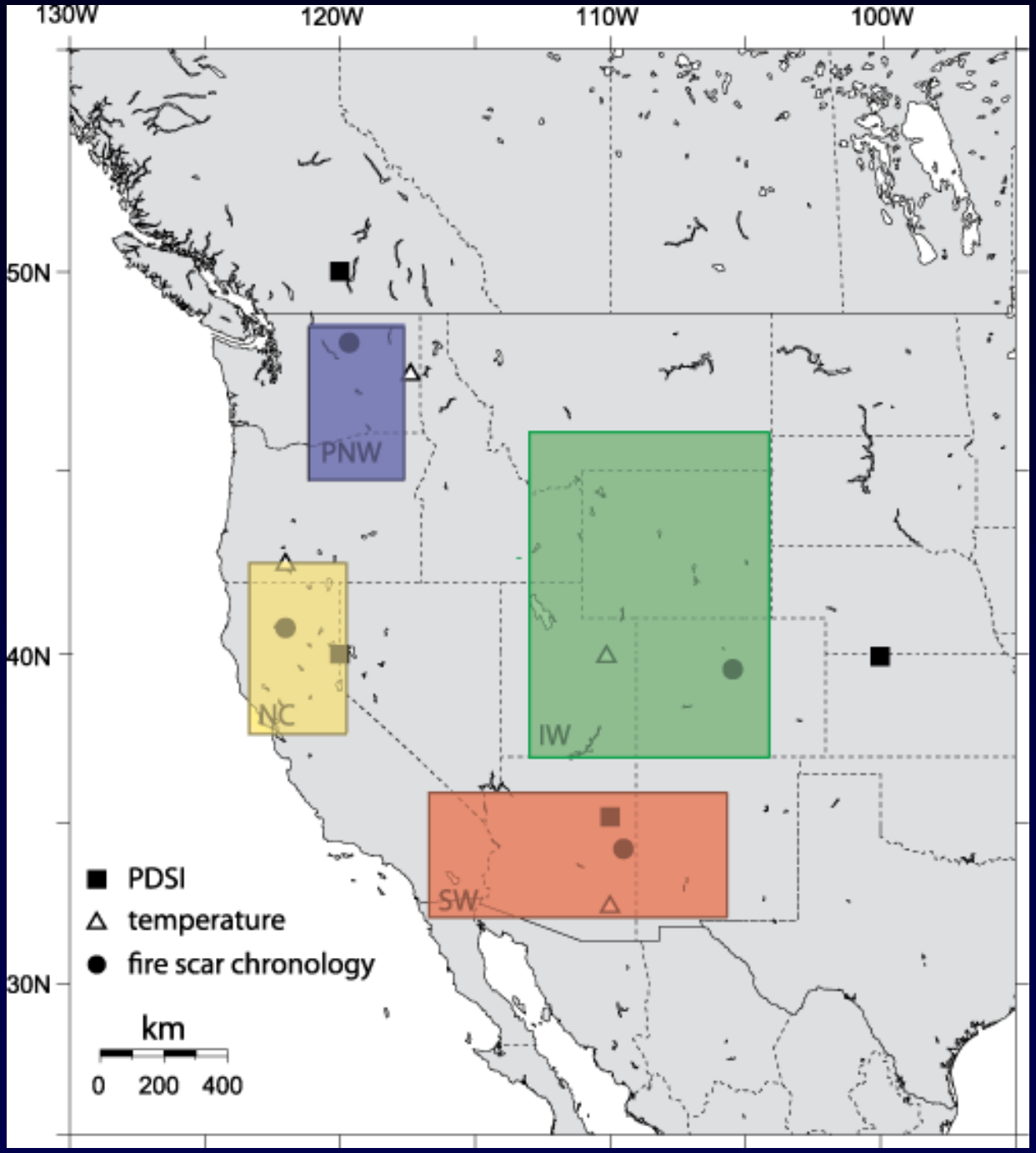
18.06.2010

Marlon et al. (2008) Nature Geosc



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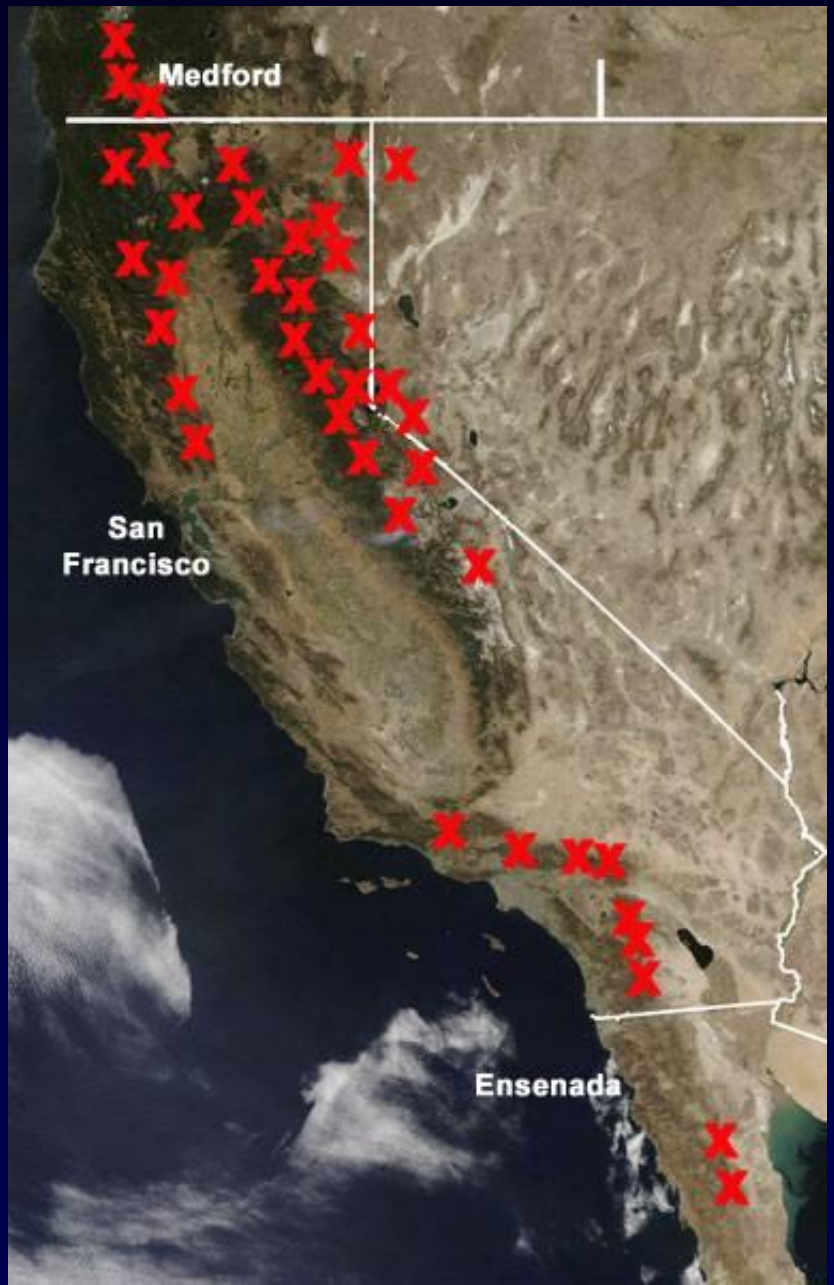
Fire scar network



- 350 sites
- 3000 trees
- 27000 fire scars
- Pinus ponderosa

Taylor et al. (2007)

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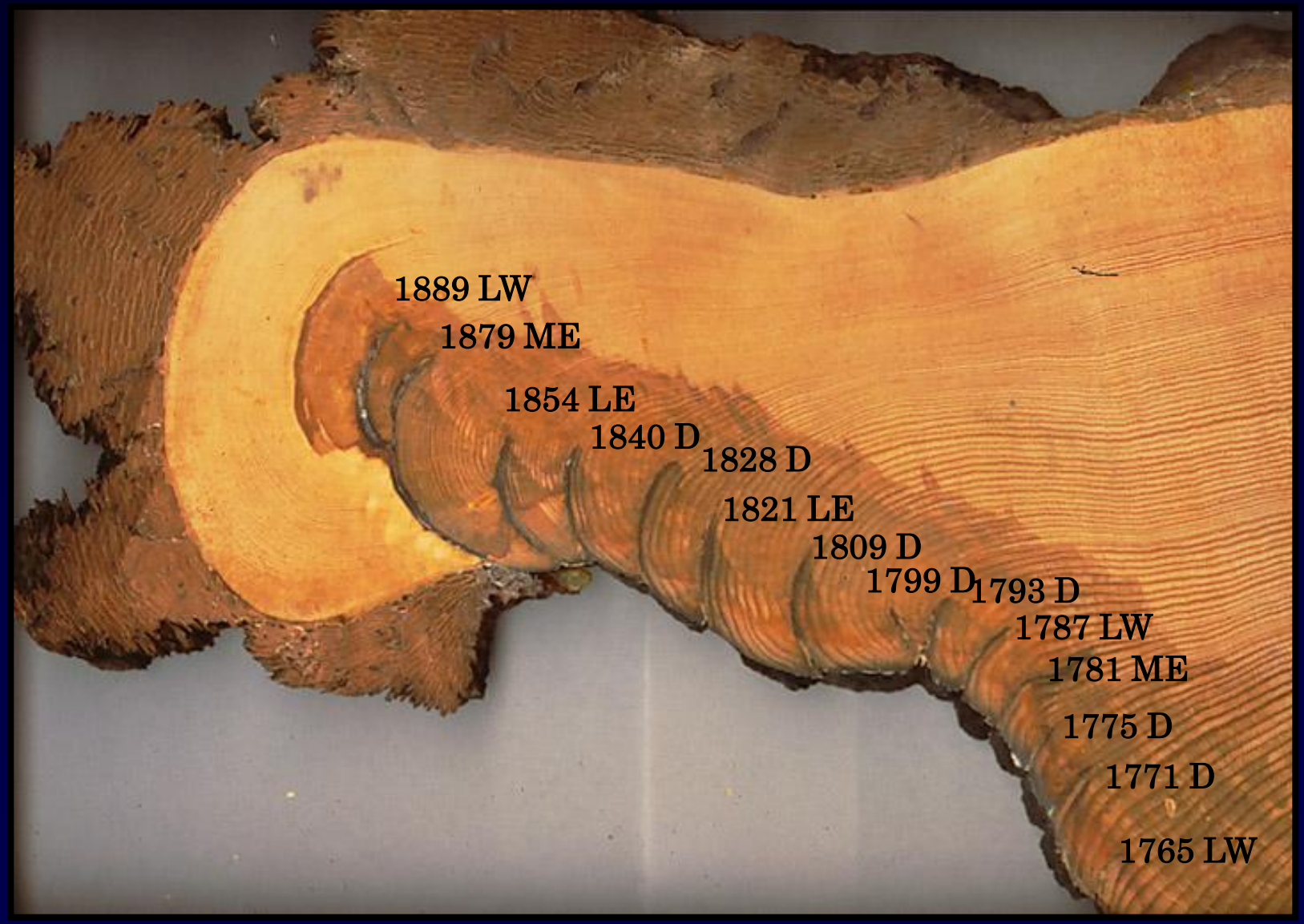

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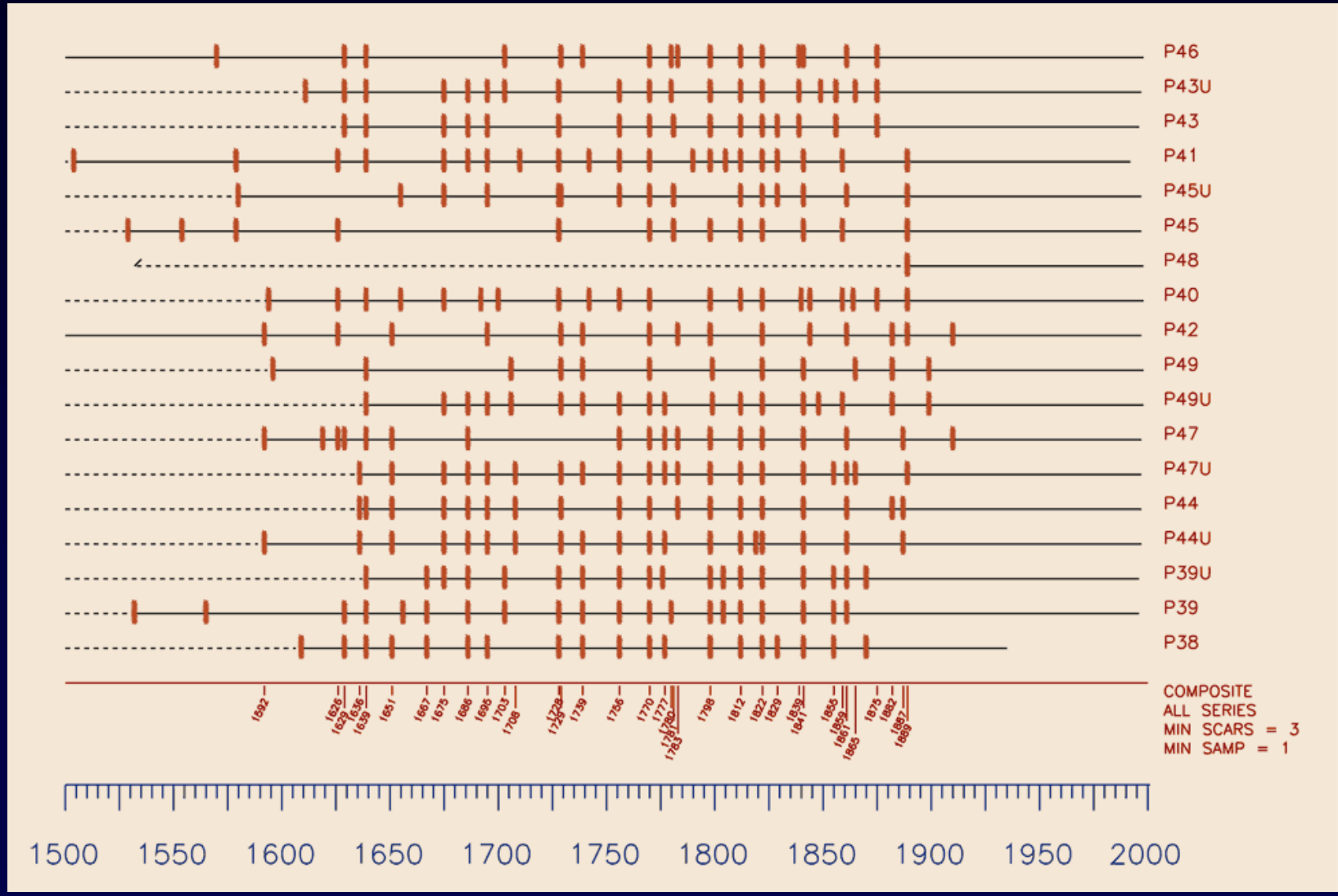
Site fire history



Blacks Mountain exp. Forest (C. Skinner)

Western U.S. 1440-1850

Region	Species	Elevation (m)	n trees	Total n fire scars	Average CFI (years)	Time-span (10 recording trees)
PNW	Pipo	1433	66	437	6.2	1441-1910
NC	Pipo Psme Cade	1630	36	471	4.2	1400-1861
IW	Pipo	2450	81	192	11.2	1281-1974
SW	Pipo	2280	51	646	2.8	1403-1859

Trouet et al. (2010) GRL

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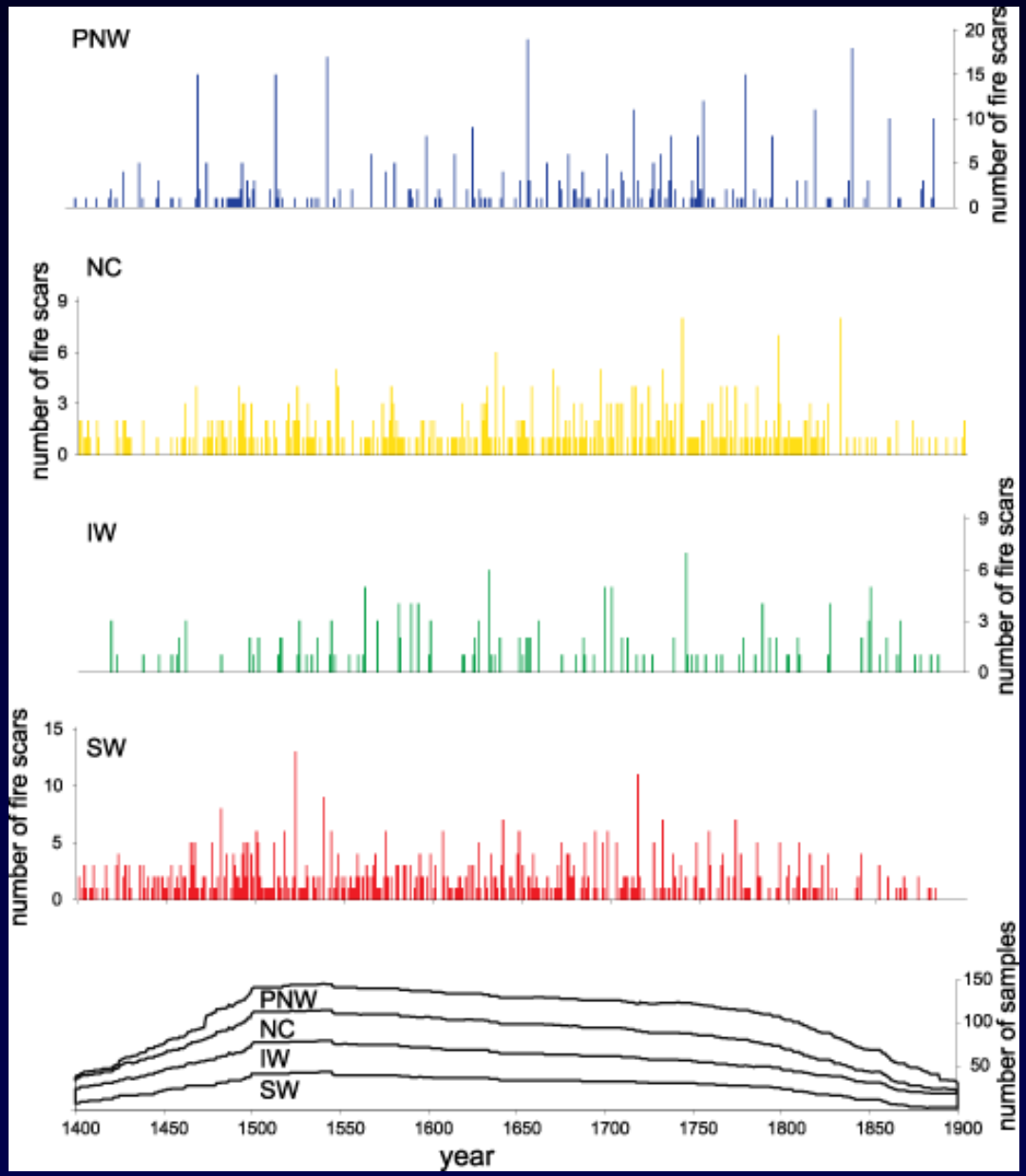
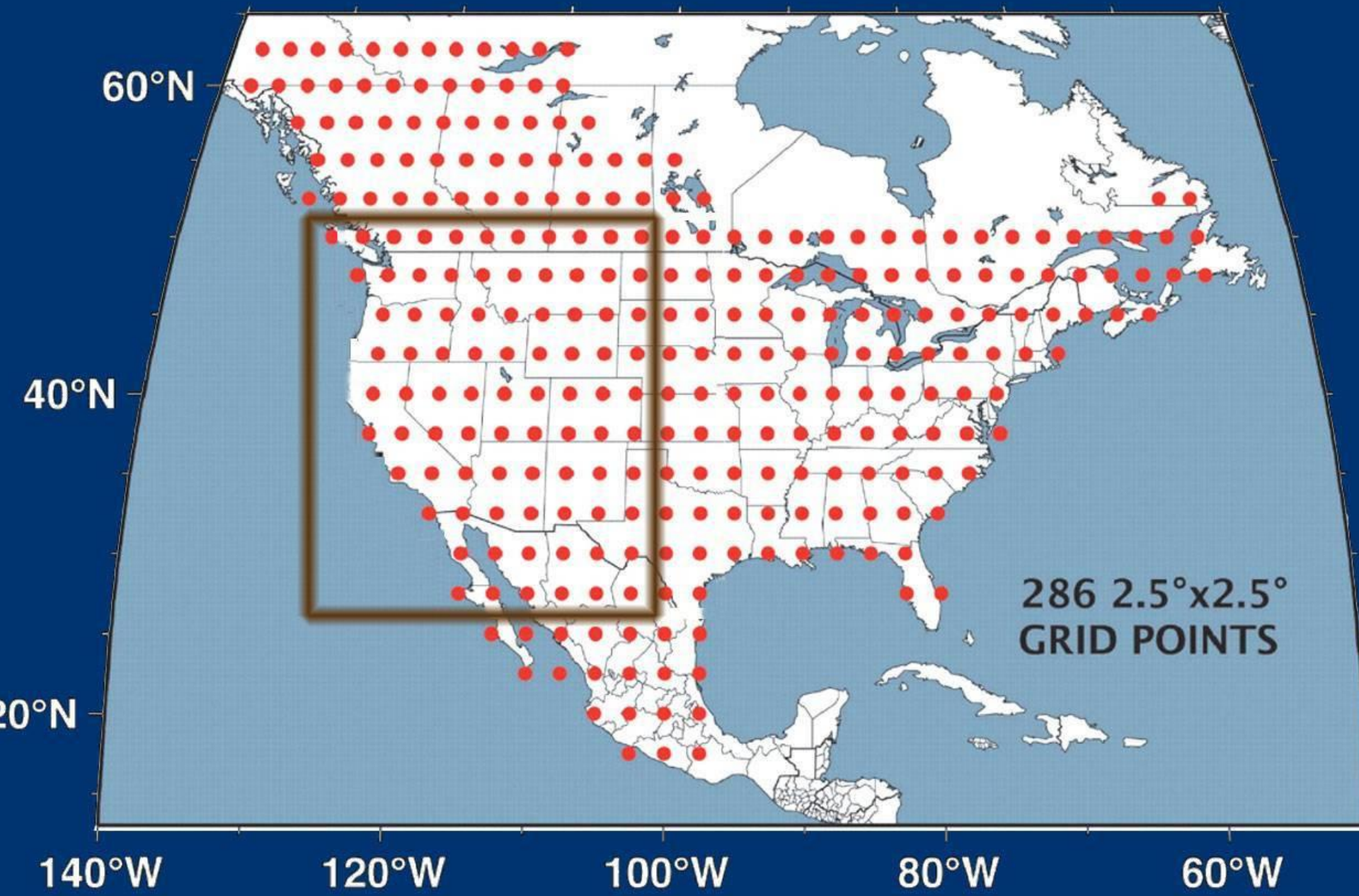
Western U.S. 1440-1850



NORTH AMERICAN DROUGHT RECONSTRUCTION GRID

Cook et al. 2004



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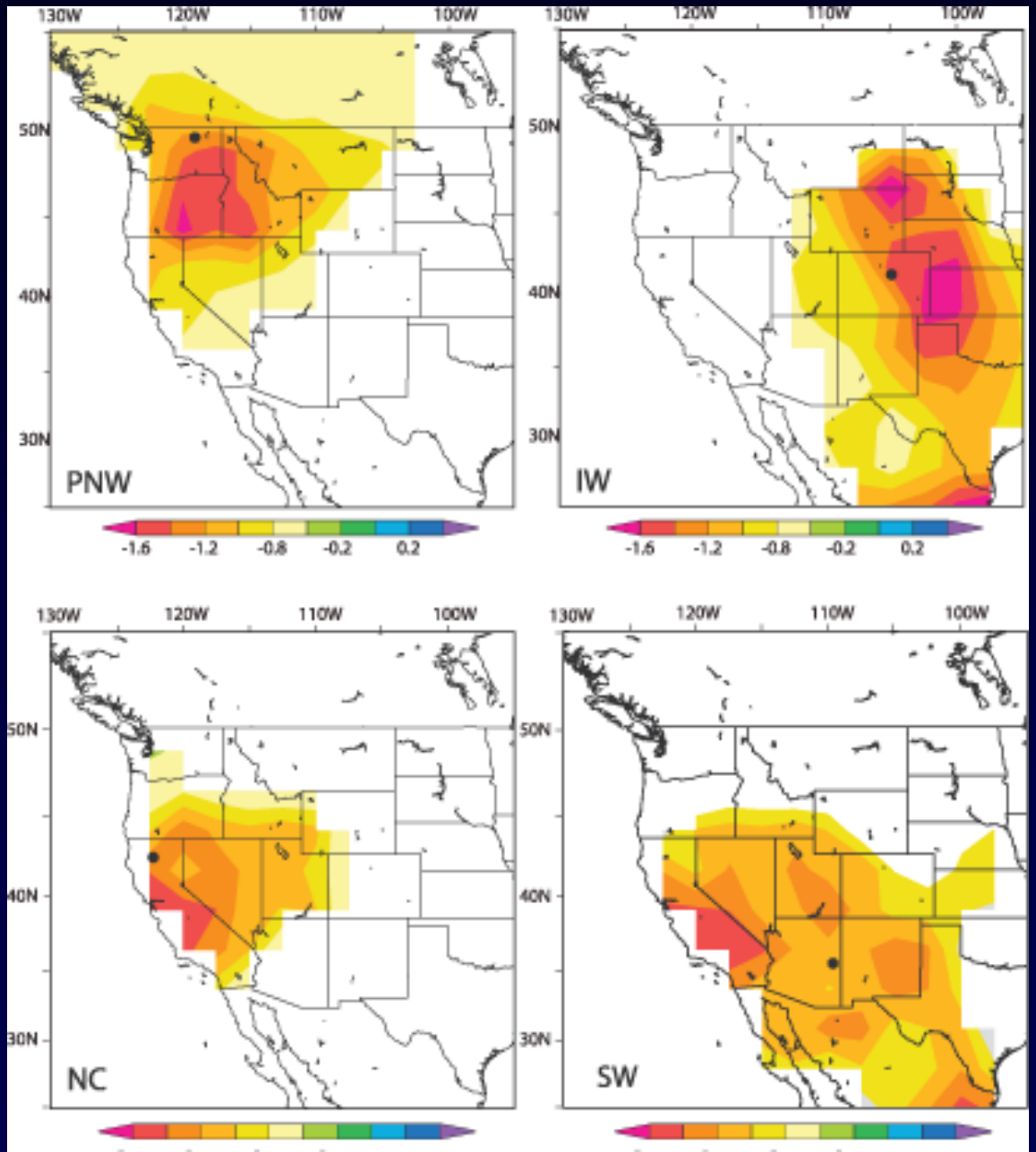
PDSI correlation maps



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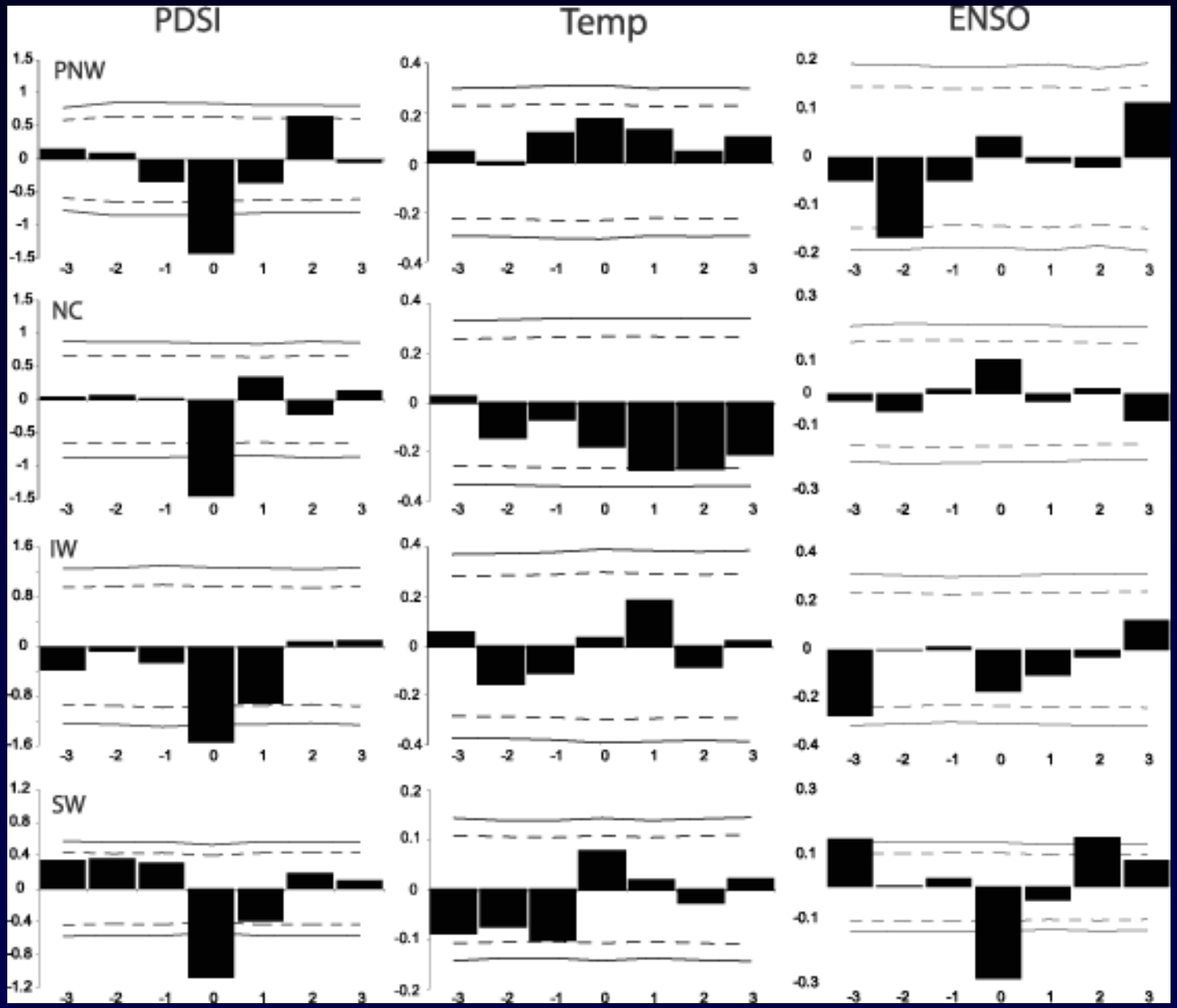
Superposed Epoch Analysis (SEA)



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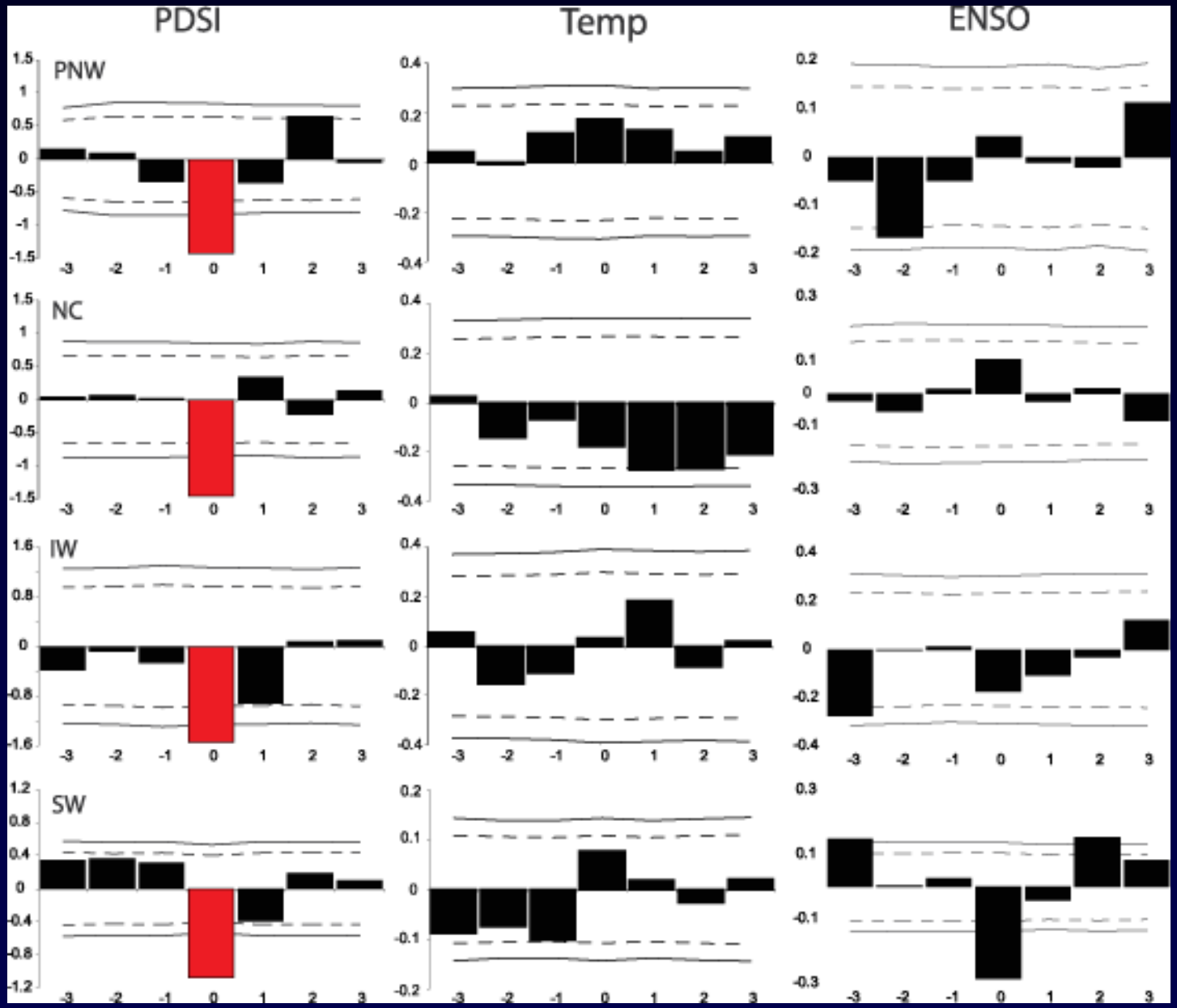

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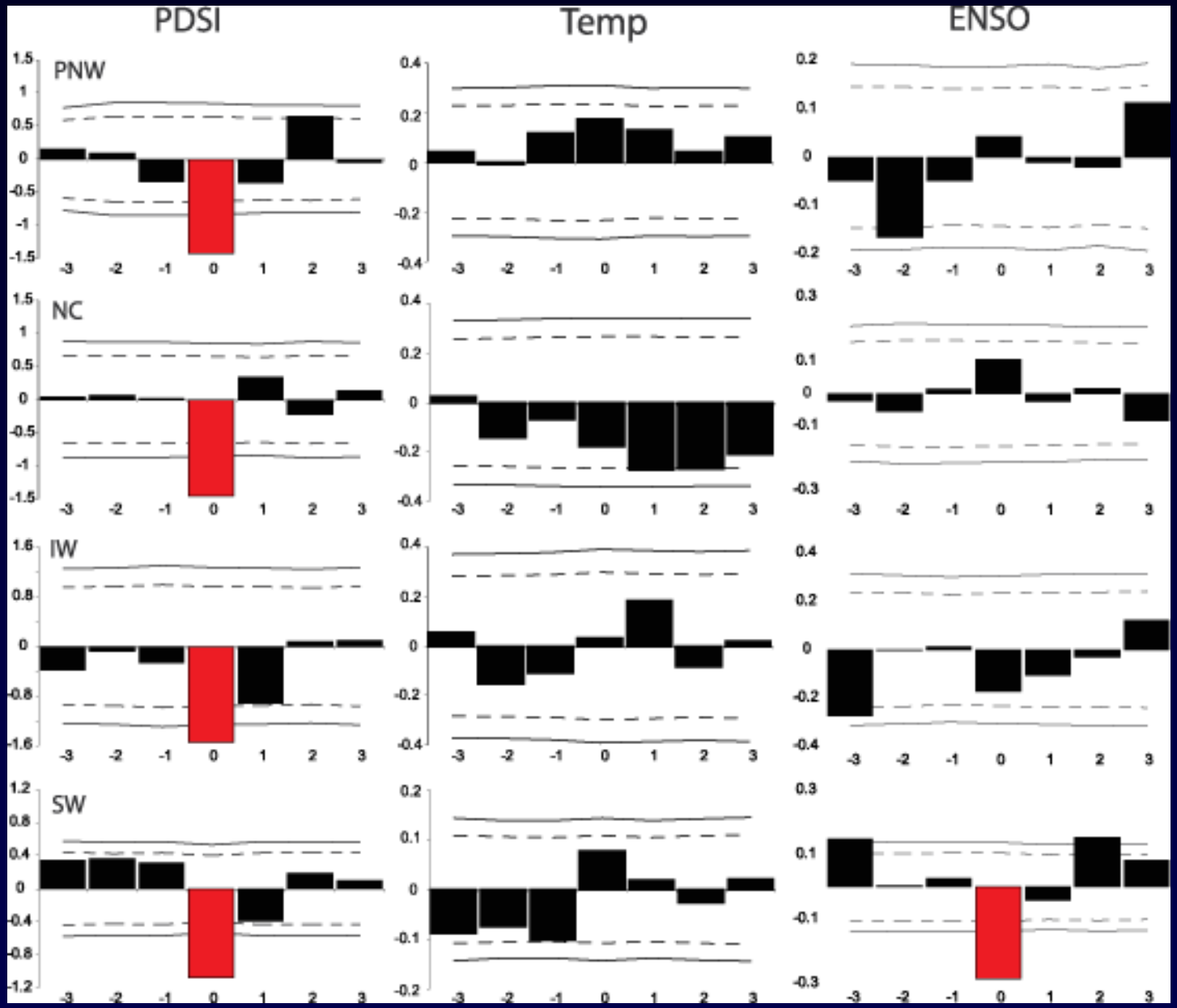
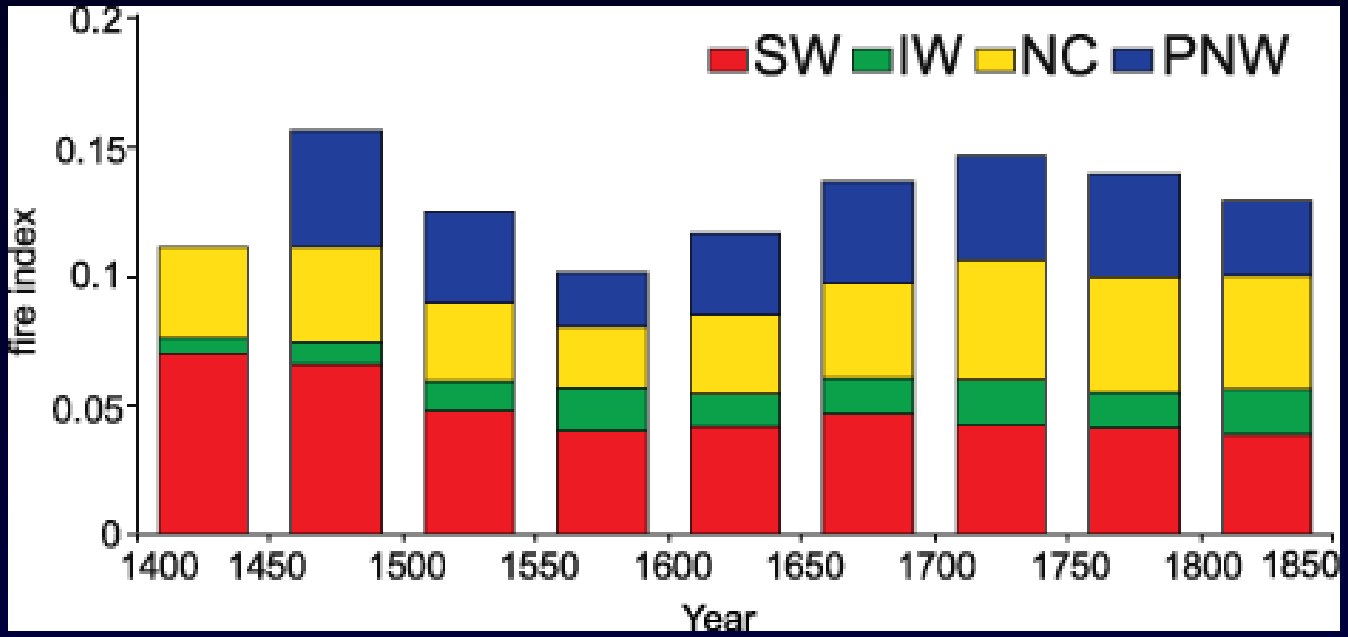
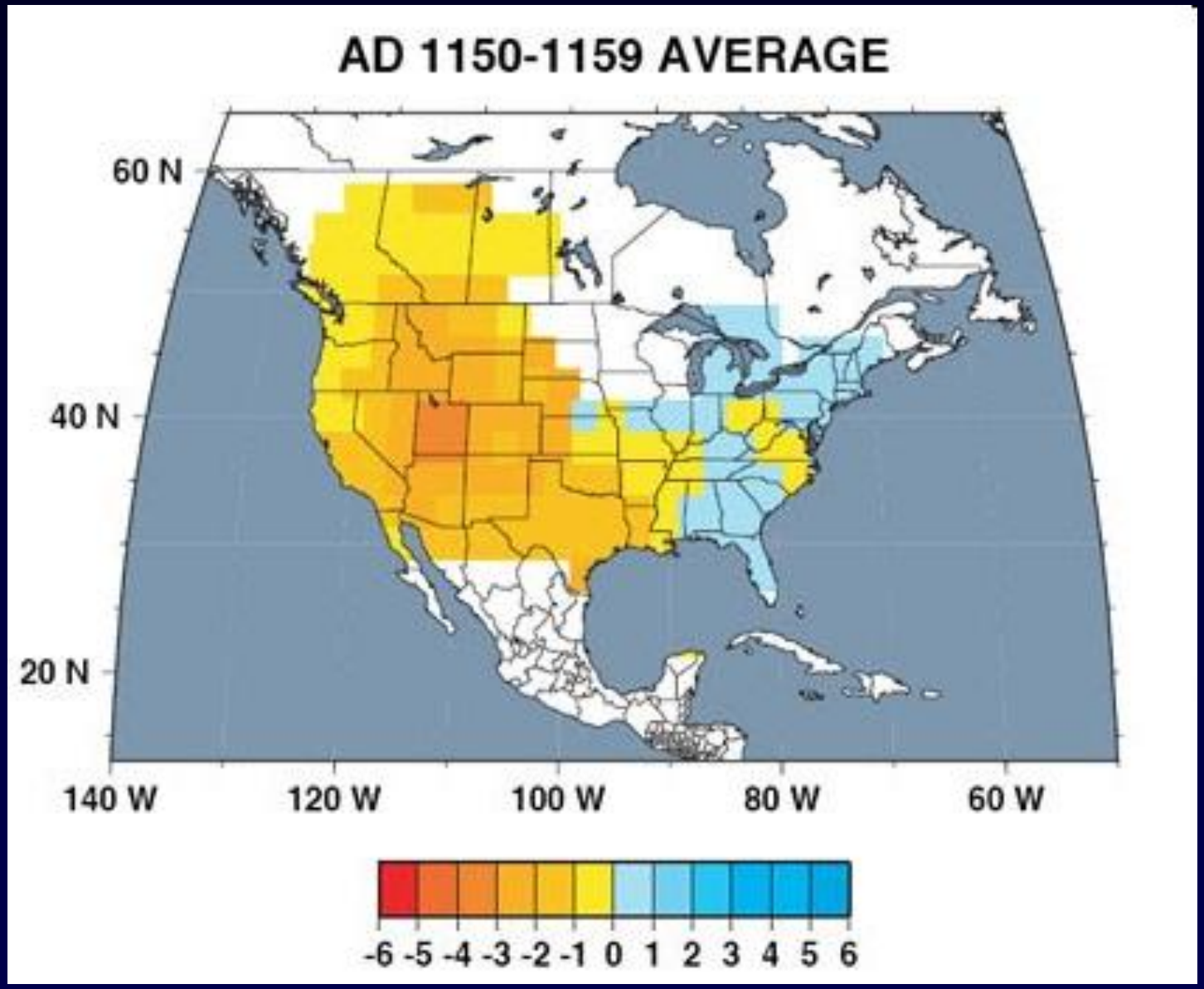


Centennial-scale fire variability

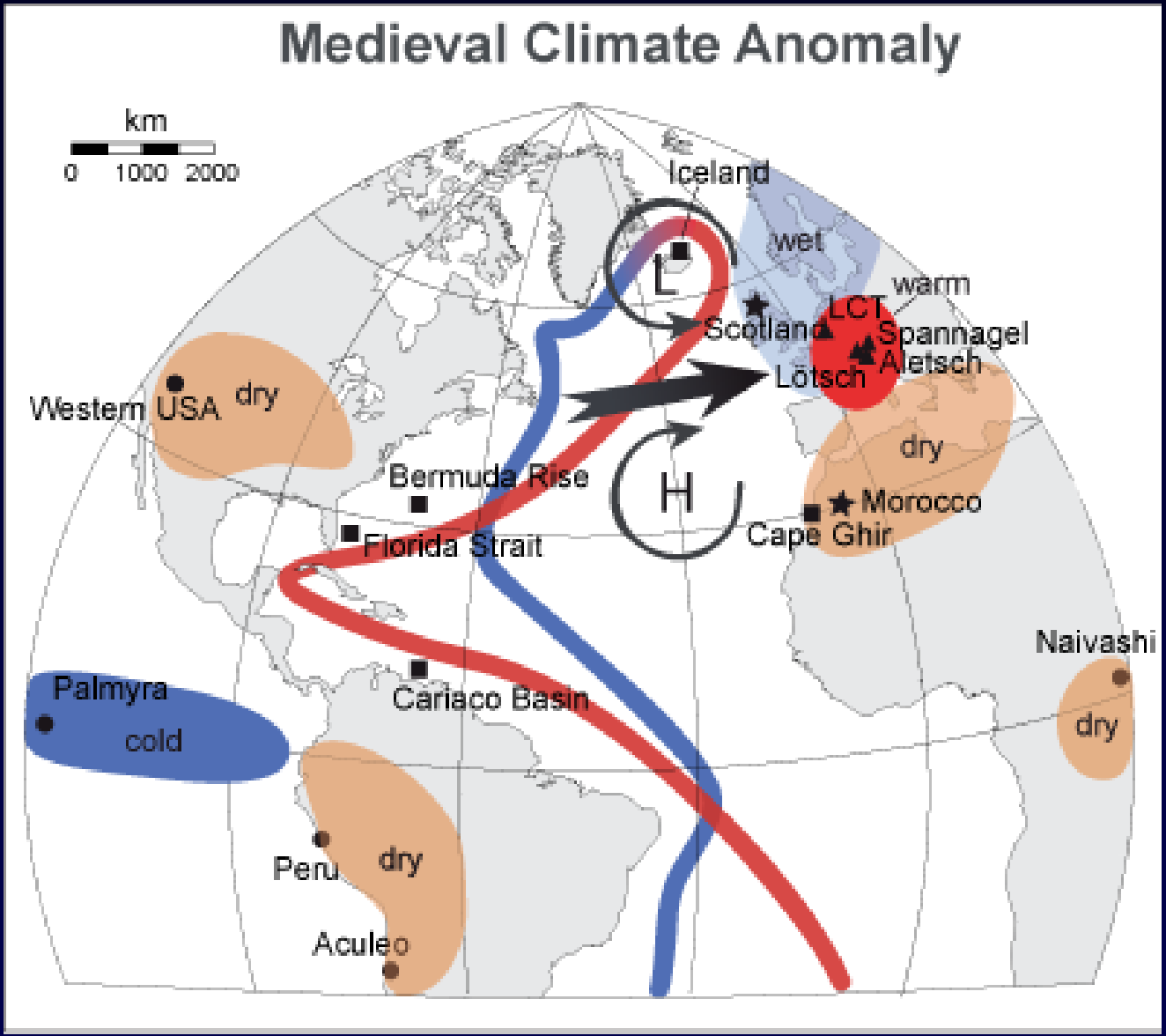


Medieval megadroughts



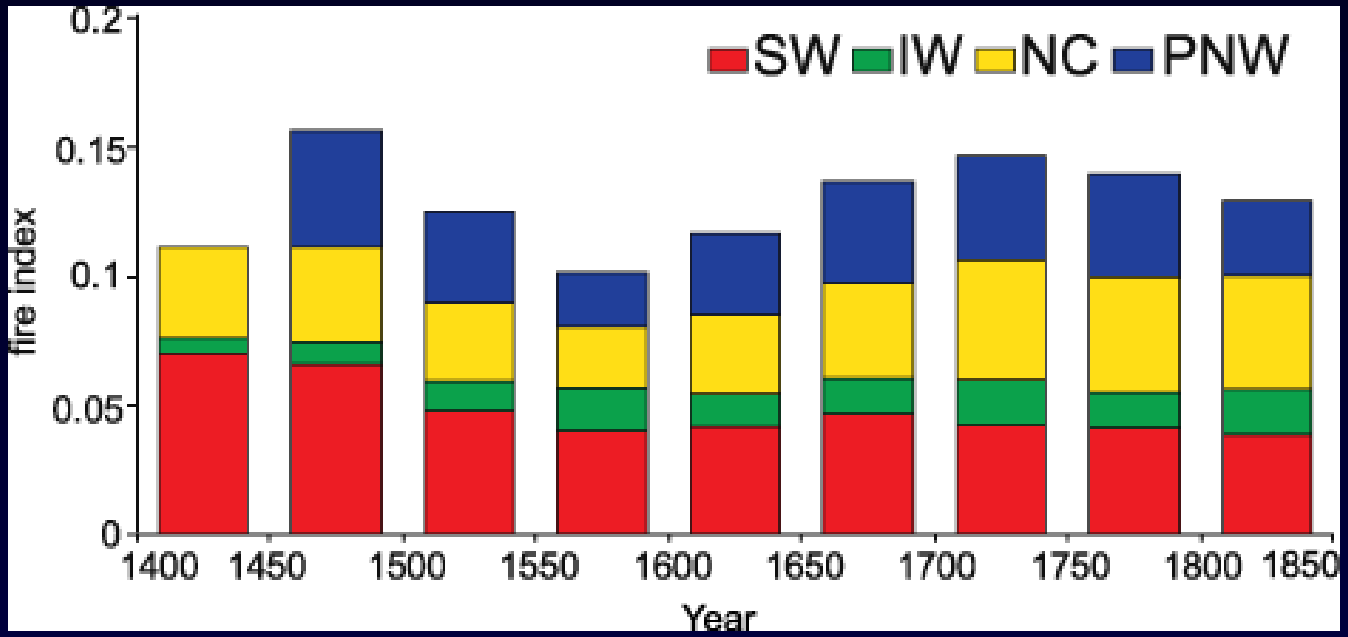
Cook et al. (2007) Earth Science Rev.

Medieval megadroughts

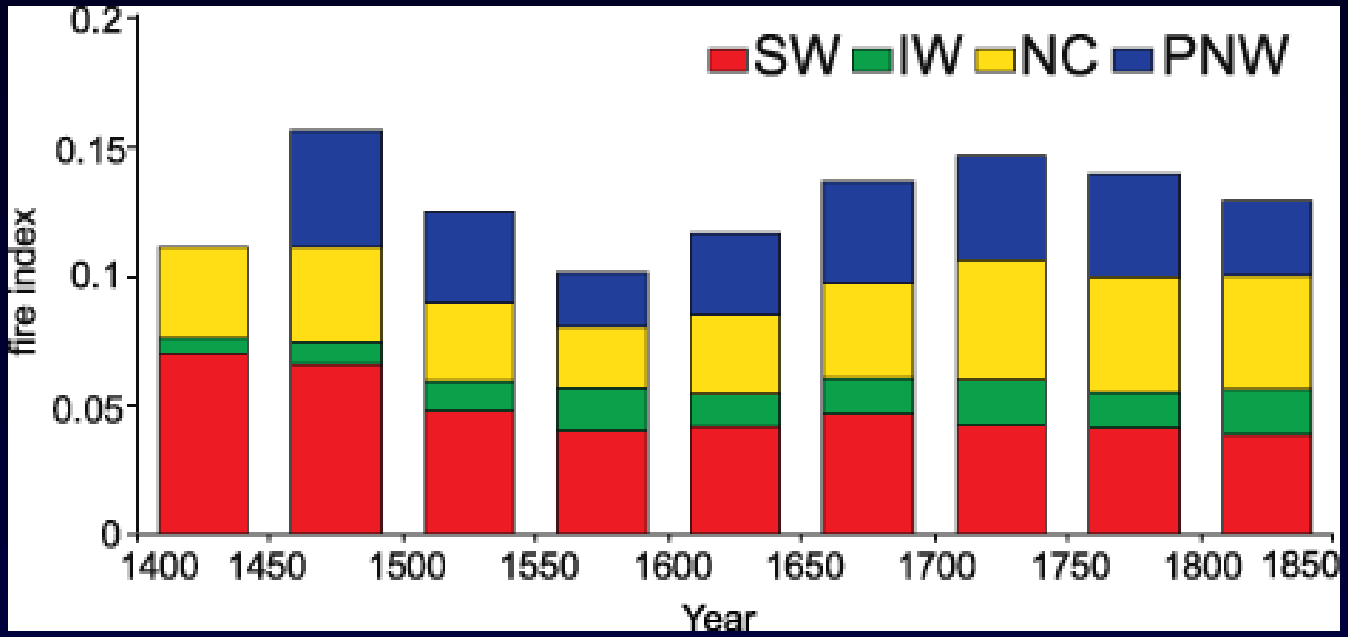


Graham et al. (2007) Clim. Dyn.
Trouet et al. (2009) Science

Centennial-scale fire variability



Centennial-scale fire variability



Thank you Paleofire Database contributors
Thank you Jan Esper and David Frank