Tropical Pacific 850 hPa Wind, SST, and RSST Anomalies during Nuclear War Scenarios

Joshua Coupe
Zonal 850 hPa Wind Anomalies /// SST Anomalies

Using the default region used in NOAA CPC reports on the status of El Nino

120E to 80W
Even without a soot injection, a moderate El Nino develops in the Summer of Yr 6 in the control run followed by a steady La Nina → El Nino oscillation… maybe too steady?

Ocean response to atmospheric wind forcing (and vice versa, of course, but initial trigger appears to be westerly wind forcing.)
In the first 5 Tg IP ensemble, El Nino … based on SSTs alone (which is flawed) … is muted compared to in the control run. However: a strong El Nino develops during FallYr3, impressive despite cooling.

Westerly wind anomalies are weaker but continue for far longer in 5 Tg case compared to the control.
You can start to see that the zonal wind anomaly strength and spatial coverage scales pretty well with the amount of initial black carbon...

SST changes are a little more variable (due to global cooling signal increasing with more BC)
5S-5N Pacific Ocean Zonal Wind Anomaly 46.8 Tg India-Pakistan

5S-5N Pacific Ocean SST Anomaly 46.8 Tg India-Pakistan
Incredibly strong zonal wind anomalies, muted SST response because global cooling is so great.

RSSTs will reveal how truly anomalously warm the Pacific is compared to the tropical mean temperatures.
Comparison of 3 ensembles of 5 Tg India-Pakistan SST Anomalies, zonal wind anomalies
Ens2 vs Ens3 SSTs
Control vs Ens 1

Zonal Wind Anomaly
5S-5N Pacific Ocean Zonal Wind Anomaly 5 Tg India-Pakistan Ens 2

Ens2 vs Ens 3

Zonal Wind Anomaly
5 Tg ensemble averages for Wind / RSST

5S-5N Pacific Zonal Wind Anomaly 5 Tg India-Pakistan AVG ENS 1,2,3

5S-5N Pacific Ocean RSST Anomaly 5 Tg India-Pakistan AVG ENS 1,2,3
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RSSTs are used by Khodri et al (2017) to filter the signal of global cooling. The mean SST from 20S to 20N is subtracted from the SSTs to get the RSSTs:
Virtually no change between control SSTs and RSSTs.
Eq. Pacific warming becomes more impressive in 5 Tg case when examining RSSTs.
Far stronger and more expansive warming, and this becomes clearer and clearer with the more BC you get.
The 150 Tg case demonstrates just how strong the Nino forcing can be.

You can see westerly anomalies beginning in the western part of the basin and accelerating in the central and eastern part of the basin. This occurs each June-August, which kickstarts strong Nino conditions for the Fall. Implies the westerly momentum comes from outside of the Pacific.
5S-5N Pacific Ocean Zonal Wind Anomaly 5 Tg India-Pakistan Ens 2

Ens2 vs Ens 3

Zonal Wind Anomaly
Using RSSTs: comparison of 5 Tg Ensembles
control
vs ens1
RSSTs
Ens2 Vs Ens3 RSSTs