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Session: New START and Nuclear Winter: Climatic Consequences  
of the Nuclear Weapons Agreement

Invited Talk

### **Climatic Effects of Regional Nuclear War**

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We use a modern climate model and new estimates of smoke generated by fires in contemporary cities to calculate the response of the climate system to a regional nuclear war between emerging third world nuclear powers using 100 Hiroshima-size bombs (less than 0.03% of the explosive yield of the current global nuclear arsenal) on cities in the subtropics. We find significant cooling and reductions of precipitation lasting years, which would impact the global food supply. The climate changes are large and long-lasting because the fuel loadings in modern cities are quite high and the subtropical solar insolation heats the resulting smoke cloud and lofts it into the high stratosphere, where removal mechanisms are slow. While the climate changes are less dramatic than found in previous "nuclear winter" simulations of a massive nuclear exchange between the superpowers, because less smoke is emitted, the changes seem to be more persistent because of improvements in representing aerosol processes and microphysical/dynamical interactions, including radiative heating effects, in newer global climate system models. The assumptions and calculations that go into these conclusions will be described.