Would “tornado-preventing” walls work?
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Introduction
Recently, Tao (2014) proposed that the tornado threat in the central United States could be eliminated if east–west walls (300 m high) were built to prevent “the clash between the northbound warm air flow and the southbound cold air flow”.

Since the proposal has received a considerable amount of publicity, it is worth briefly exploring this hypothesis in more detail.

Methods
• Using the WRF model (version 3.5.1), three simulations using the 31 May 2013 convective episode were performed—one with natural terrain, one with 300 m tall walls as proposed, and another with walls much taller than proposed (2500 m).
• The “tornado-preventing” walls were created by adding a constant to the model’s surface elevation in three locations (southern Texas and Louisiana, the Kansas and Oklahoma border, and in North Dakota).

Precipitation and Storm Tracks
• The control and 300 m simulations produced similar values of accumulated precipitation and tracks of 1–6 km updraft helicity.
• The 2500 m simulation shifted the supercells east.

Temperature and Humidity
• The temperature field is unaffected by the 300 m walls, while temperatures increase north of the 2500 m walls.
• The moisture flow simply rises up and over the 300 m walls, while it is blocked by the 2500 m walls.
• Evidence of desertification in the southern Plains.

CAPE and Supercell Parameter
• The walls are unsuccessful at impeding the midlevel, westerly winds aloft with steep lapse rates.

Surface Vertical Vorticity
• Increased probability of non-supercell tornadoes near the edges of the 2500 m walls.

Future Work
Future work could include seasonal simulations to investigate longer-term storm statistics, but we have no plans to continue this line of work until there is reason to believe the walls would have any effect.

Citation