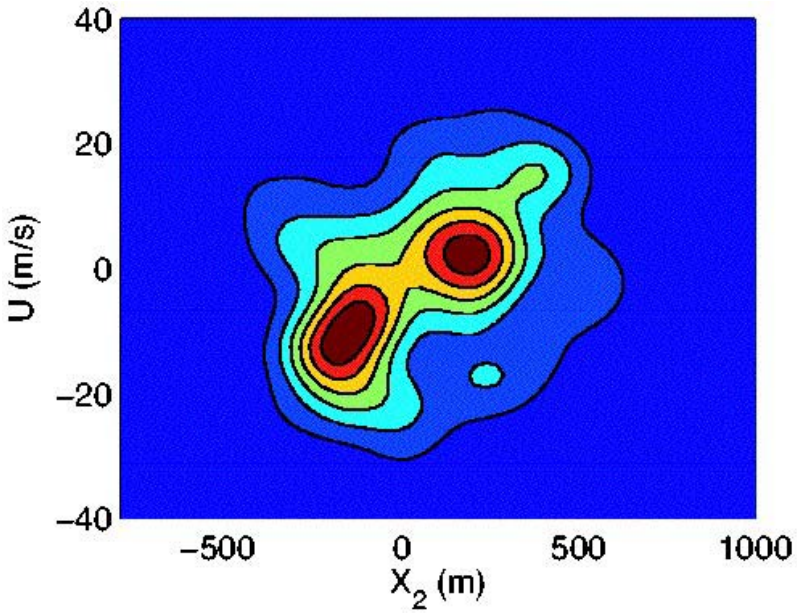
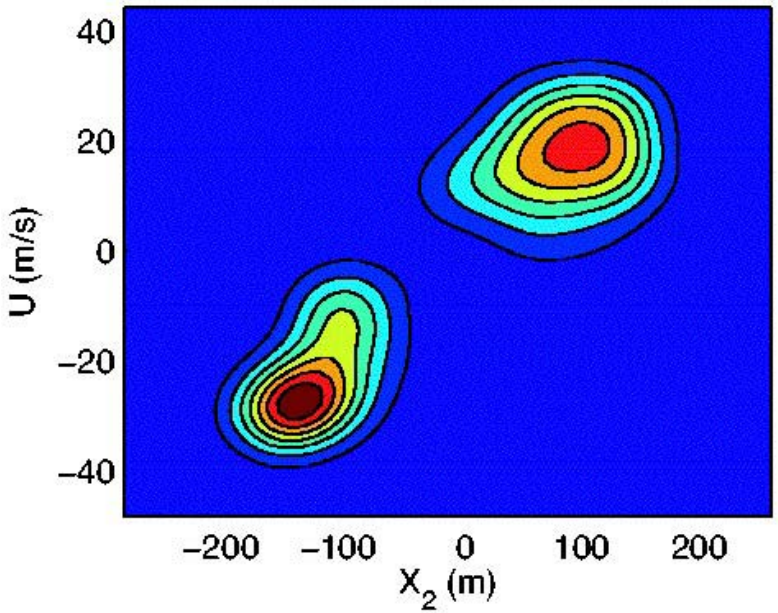
The project "Modeling of Solar Influence on Atmospheric Dynamics" (PI, A.Ruzmaikin) identified two major regimes (attractors) in zonal wind-planetary wave non-linear interaction in the stratosphere-troposphere. Solar variability changes the occupation frequencies of these attractors



Observed probability distribution
(NCEP data 1948-2003, 60° lat, 20 hPa, solar max conditions, East QBO), U zonal wind, X_2 cos- wave amplitude.

Maxima show two regimes.



Modeled probability distribution
yields two regimes.

The significance of work "Modeling of Solar Influence on Atmospheric Dynamics" by Ruzmaikin et al.

Addressing one of the main goals of the LWS Program of "improving our understanding of the effects of solar variability and disturbances on terrestrial climate change" we demonstrated that

1. Solar variability influences climate primarily by changing occupation of two regimes of the North Annual Mode (Ruzmaikin and Feynman, JGR, v.107, 2002; Ruzmaikin et al. GRL, v.31, 2004). The effect depends on the phase of the Quasi-Biennial Oscillation (QBO) of tropical zonal winds.

2. Our simple modeling of 'zonal wind-planetary wave' non-linear interaction captures the essential physics of the mechanism of solar influence. It yields two major regimes (Ruzmaikin, Lawrence and Cadavid, J. of Climate, v.16, 2003) with occupation frequencies sensitive to solar variability and QBO (Ruzmaikin, Cadavid, and Lawrence, GRL, 2004, submitted).