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Solar Active Longitudes Resulting from Thin Flux Tube Simulations in a Solar-like Convective Envelope MARIA WEBER, NCAR/High Altitude Observatory and Colorad State University, YUHONG FAN, MARK MIESCH, NCAR/High Altitude Observatory — Solar observations show that the emergence of active features is distributed inhomogeneously in longitude according to sunspot activity, solar x-ray flares, and coronal streamers. In addition, an asymmetry exists between active region associated phenomena in the Northern and Southern hemispheres. Using a thin flux tube model in a rotating spherical shell of solar-like convective flows, we find that these simulated flux tubes tend to emerge asymmetrically in number in the Northern and Southern hemispheres, and emerge at preferred longitudes. The active longitudes our simulations produce often span across the equator between low latitudes of 15 degrees to -15 degrees, and persist and propagate prograde for multiple solar rotation periods. We suggest that the active longitudes in our simulation are the result of columnar, rotationally aligned giant cells present in the convection simulation at low latitudes. If giant convecting cells exist in the bulk of the solar convection zone, this phenomenon could in part provide an explanation for the North/South asymmetry of active region emergence as well as active longitudes.

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