Geophysical Research Abstracts
Vol. 12, EGU2010-8139, 2010
EGU General Assembly 2010

Effects of Vertical Wind Shear on Convective Development during a Landfall of Severe Tropical Storm Bilis

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Effects of vertical shear of large-scale zonal wind on convective development during the landfall of Typhoon Bilis (2006) are investigated with a pair of sensitivity experiments using a two-dimensional cloud-resolving model. The validated simulation data from Wang et al. (2009) are used as the control experiment. The difference between the control and sensitivity experiments is that zonal winds are replaced by their mass-weighted means in the sensitivity experiment. The imposed vertical velocity with ascending motion in the upper troposphere and descending motion in the lower troposphere is responsible for dominant stratiform rainfall on 15 July. The vertical wind shear does not have important impacts on development of stratiform rainfall. One day later, imposed upward motion extends to the lower troposphere. The inclusion of negative vertical wind shear produces well-organized convection and strong convective rainfall because the negative vertical wind shear causes kinetic energy transfer from large-scale forcing to perturbation circulations.