Geophysical Research Abstracts, Vol. 7, 07972, 2005
SRef-ID: 1607-7962/gra/EGU05-A-07972

Numerical simulation of convective cloud fields past complex terrain

Z. P. Piotrowski (1), M. Andrejczuk (1), P. Drzewiecki (1), B. Jakubiak (3), J. Krawczyk (1), L. Lobocki (2), S. P. Malinowski (1), P. K. Smolarkiewicz (4), J. Struzewska (2)

(1) Warsaw University Institute of Geophysics (zbych@igf.fuw.edu.pl / Phone: 4822 5546812), (2) Warsaw University of Technology Institute of Environmental Engineering Systems, (3) Warsaw University Interdisciplinary Centre for Mathematical and Computational Modelling, (4) National Center for Atmospheric Research

We highlight a unique series of multiscale simulations of natural atmospheric flow past complex terrain of southern Poland, set in the scenario of a summer NW synoptic inflow. The routine hydrostatic mesoscale predictions at 17 km resolution, using the Unified Model for Poland Area (UMPL meteo.icm.edu.pl) continuously supply the initial, boundary, and ambient conditions high-resolution simulations, using the non-hydrostatic anelastic model EULAG . The EULAG domain 240 x 200 km2 embedded within the UMPL Central European domain (2000 x 2400 km2) has been covered with 4, 2, and 1 km horizontal grid intervals; while keeping the vertical resolution double of UMPL. Notwithstanding the abrupt changes in the nested domains' horizontal resolutions, our comparison of simulated cloud fields with the AQUA/TERRA (rapidfire.sci.gsfc.nasa.gov) satelite photographs documents that the evolution (viz. location and timing) of moist convection is well captured in all simulations. As the resolution of the EULAG domain improves, the representation of convective clouds becoms increasingly more realistic. In particular, at 2 km resolution, irregular convective Rayleigh-Benard type cells are observed in simulated boundary layers. These cells are even better seen at 1 km resolution, in which individual shallow convective clouds with bases at 1100m and tops at about 2500m are nicely represented. Consistently, the strongest clouds appear over the intersection of the updrafts in the cells and in the regions where orographic forcing is dominant.