

### **Description: Brazilian Regional Atmospheric Modeling System (BRAMS)**

By Rafael Rosolem ([rafael@hwr.arizona.edu](mailto:rafael@hwr.arizona.edu))  
Department of Hydrology and Water Resources  
The University of Arizona

The Brazilian RAMS (BRAMS) was developed by many research agencies and universities in Brazil which main goal is to provide substantial improvements on forecast quality in tropical and subtropical regions. Moreover, the development of the model is also motivated by the idea of a single/unified model to Brazilian Regional Weather Center. The model is based on the Regional Atmospheric Modeling System (RAMS), developed by Pielke et al. 1992 and later modified by Walko et al. 2000 with several new functionalities and parameterizations associated mainly with tropical and subtropical regions. For instance, BRAMS main features follow RAMS version 5.04 with additional options:

- New deep and shallow cumulus scheme based on the mass flux approach developed by Grell and Devenyi, 2002);
- Daily soil moisture data for initialization, developed by Gevaerd and Freitas, 2006);
- Surface parameterization is associated with the Simple Biosphere Model 2.5 (Collelo et al. 1998, Baker et al. 2003);
- Improved serial and parallel performance;
- Binary reproducibility, i.e. the same results are obtained independent of processors;
- Inclusion of Town Energy Budget (TEB) and Simplified Photochemical Model (SPM) schemes;
- Inclusion of Coupled Aerosol and Tracer Transport (CATT) scheme;
- Corrections in Shaved-ETA and LEAF schemes based on RAMS version 6.x.

BRAMS started as a software project sponsored by the Financiadora de Estudos e Projetos-FINEP (Brazilian Funding Agency) during 2002 and 2003, it has received contributions from several research institutes such as the Centro de Previsão de Tempo e Estudos Climáticos-CPTEC (National Weather Prediction and Climate Center), a division of the Instituto de Pesquisas Espaciais-INPE (National Space Research Institute); Universidade de São Paulo-USP (University of São Paulo), and Atmospheric Meteorological and Environmental Technologies (ATMET). Like RAMS, BRAMS has recently become an open source code under GNU General Public License project (GPL). For more information, visit <http://www.cptec.inpe.br/brams/>.