## **Recent developments on SURFEX**

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## Main applications in 2008

- Surface analysis
- AMMA
- Carbon version of ISBA
- Hydrology (SIM)
- Climate
- Towns
- Belgium, Slovenia and Hungary
- Nilu: EnKF LDAS
- Hirlam: Training course for students



Coupling with Aladin in progress





Coupling with Arpege in stand-by, Harmonie et Alaro available soon







### Evolution of the various schemes

- Subgrid hydrology
  - Ksat exponential profile
  - Subgrid distribution of precipitation
  - Hortonian runoff from infiltration excess
- Desertic dust (DEAD model)
- ID CLS prognostic scheme CANOPY
- Lake model FLake (Mironov, 2003)
- 1D Mixed Layer Ocean (MLO)
- New climatology database ECOCLIMAP II
- Adaptation of ISBA 2L over Antarctica





### Planned developments for 2009

- Validation of ECOCLIMAP II :
  - Test over CarboEurope domain, CarboFrance project, SIM
- Evaluation of FLake in coupled mode with Meso-NH 3D
- Evaluation of CANOPY in 1D and 3D
- Evaluation of SURFEX over Antarctica (DomeC)
- SURFEX maintenance and user support :
  - Scientific documentation (started)
  - Development of a code management tool
  - First SURFEX training course
  - External web site (including ECOCLIMAP)
- SURFEX new features :
  - Double surface energy balance (snow/forest interactions) (HIRLAM /CESBIO)
  - EKF for Land Data Assimilation (ALADIN/LACE/HIRLAM)





### Offline evaluation of SURFEX



#### Measurements and validation of FLake over Alqueva lake





#### Integration of Flake within SURFEX



### **1D Mixed Layer Ocean**

#### BATHYMETRY



#### **INITIAL CONDITIONS**

DEPTH (m): 5 DATA SET: ext-mercotorPsy2v1R1v\_med\_meon\_20031203\_R20031217 MERCATOR PSY2V1R1 VITRINE



### **MODEL STRUCTURE**





### **ECOCLIMAP II**







### **ECOCLIMAP II**

#### 7 classes for crops Land cover of Corine 2000: 100 m resolution Sea Crops cluster 3 Crops cluster 6 Crops Crops cluster 7 luster 1 Crops Juster 4 Crops uster 2 Crop cluster 5 september 1.0 2003 2000 2001 1999 april 0.8 0.8 - 0.6 > □ ∠ 0.4 0.6 Summer crops (corn) Winter crops (wheat) 0.4 mixed crops 0.2 0.2 **NDVI PROFILES FOR DIFFERENT CLASSES** 0.0 0.0 2002 2003 CENTRE NATIONAL **METEO FRANCE** DE LA RECHERCHE SCIENTIFIQUE Toujours un temps d'avance

### Modelling over Antarctica

- Collaboration with Astrophysics Laboratory of Arcetri in Florence:E. Masciadri et F. Lascaux. Improved optical turbulence.
- **Objectives:** 
  - At the start, user support on meso-NH regarding surface aspects
  - Improvements of the current system to better simulate Ts
  - Characterize the PBL in Antarctica et simulate improved surface fluxes

ETEO FRANCE



### Modelling over Antarctica

- Method:
  - Simplified description of the surface at DomeC: isba-2L over frozen soil
    - No water exchanges
    - Modified thermal conductivity low density ice
    - Include a restore term towards a climatological Tc in the deep soil temperature equation T2
  - Calibration of Tc of the time constant  $\gamma$  for improving T2:

$$\frac{\partial T_2}{\partial t} = \frac{1}{\tau}(T_s - T_2) + \frac{1}{\gamma\tau}(T_c - T_2)$$



# Thank you for your attention !



