

SPITSOIL SPECIAL PROJECT PROGRESS REPORT

Reporting year 2015

Project Title: Testing soil condition perturbations for a convection-permitting ensemble over Italy

Computer Project Account: SPITSOIL

Principal Investigator(s): Nicola Loglisci
Riccardo Bonanno

Affiliation: ARPA Piemonte

Name of ECMWF scientist(s) collaborating to the project (if applicable)

Start date of the project: 02-07-2014 (Date of approval)

Expected end date: 31-12-2016

Computer resources allocated/used for the current year and the previous one
(if applicable)

Please answer for all project resources

		Previous year		Current year	
		Allocated	Used	Allocated	Used
High Performance Computing Facility	(units)	500000	500000	500000	0
Data storage capacity	(Gbytes)	100	100	100	0

Summary of project objectives

(10 lines max)

The project aims to develop and test a perturbing technique of the soil initial state in order to include soil perturbation in the convection-permitting ensemble COSMO-IT-EPS currently under development in Italy in collaboration between ARPA-SIMC, ARPA-Piemonte and CNMCA.

Summary of problems encountered (if any)

(20 lines max)

During this year we performed other simulations with the suites accounting for high resolution COSMO-EPS mode. Following is a summary of differences among suites:

SUITE-SOIL: initial soil moisture field (from both ECMWF and DWD) is perturbed using a stochastic pattern generator.

SUITE-EPS: initial and boundary conditions of the atmosphere is perturbed according with 10 random members taken from ECMWF EPS system.

SUITE-EPS-SOIL: both soil moisture IC and atmosphere IC and BC are perturbed.

SUITE-EPS-SOIL-PHYSICS: add a perturbation of some physical parameters taken into account in the convection calculation of the high resolution COSMO model.

The added case studies have been selected in order to verify the results previously obtained.

For this reason two other early summer case studies, involving convection triggered by Atlantic troughs passing over Europe have been selected.

Another test have been made considering a late summer case study where convection is generated by a disturbance passing South and Central Europe, coming from the North.

Summary of results of the current year (from July of previous year to June of current year)

This section should comprise 1 to 8 pages and can be replaced by a short summary plus an existing scientific report on the project

Results of new tests performed, confirm the appreciable daytime spread increase in summer case studies when surface fluxes are stronger allowing the transfer of soil moisture variability into the atmosphere.

Among surface variables Soil Moisture give the biggest contribution generating and increasing spread of the near surface prognostic variables as well as upper in the troposphere.

Spread is larger when DWD soil moisture analysis is used as surface field to perturb (IFS being more wet).

More in depth explanations can be found in the COSMO Newsletter No. 14 and 15 (see references).

List of publications/reports from the project with complete references

Bonanno R., Loglisci N. 2014 “A sensitivity test to assess the impact of different soil moisture initializations on short range ensemble variability in COSMO model”, COSMO Newsletter No. 14 - <http://www.cosmo-model.org/content/model/documentation/newsLetters/newsLetter14/default.htm>

Bonanno R., Loglisci N. 2015 “Setting up COSMO EPS perturbing lower boundary conditions: sensitivity and case studies”, COSMO Newsletter No. 15 - <http://www.cosmo-model.org/content/model/documentation/newsLetters/newsLetter15/default.htm>

Summary of plans for the continuation of the project

(10 lines max)

The soil moisture perturbation will be inserted in a complete limited area model ensemble system based on the high resolution COSMO model the COSMO-IT-EPS where atmospheric IC and BC will be perturbed. COSMO-IT-EPS will be tested over the month of May 2016.