CSEP Italy

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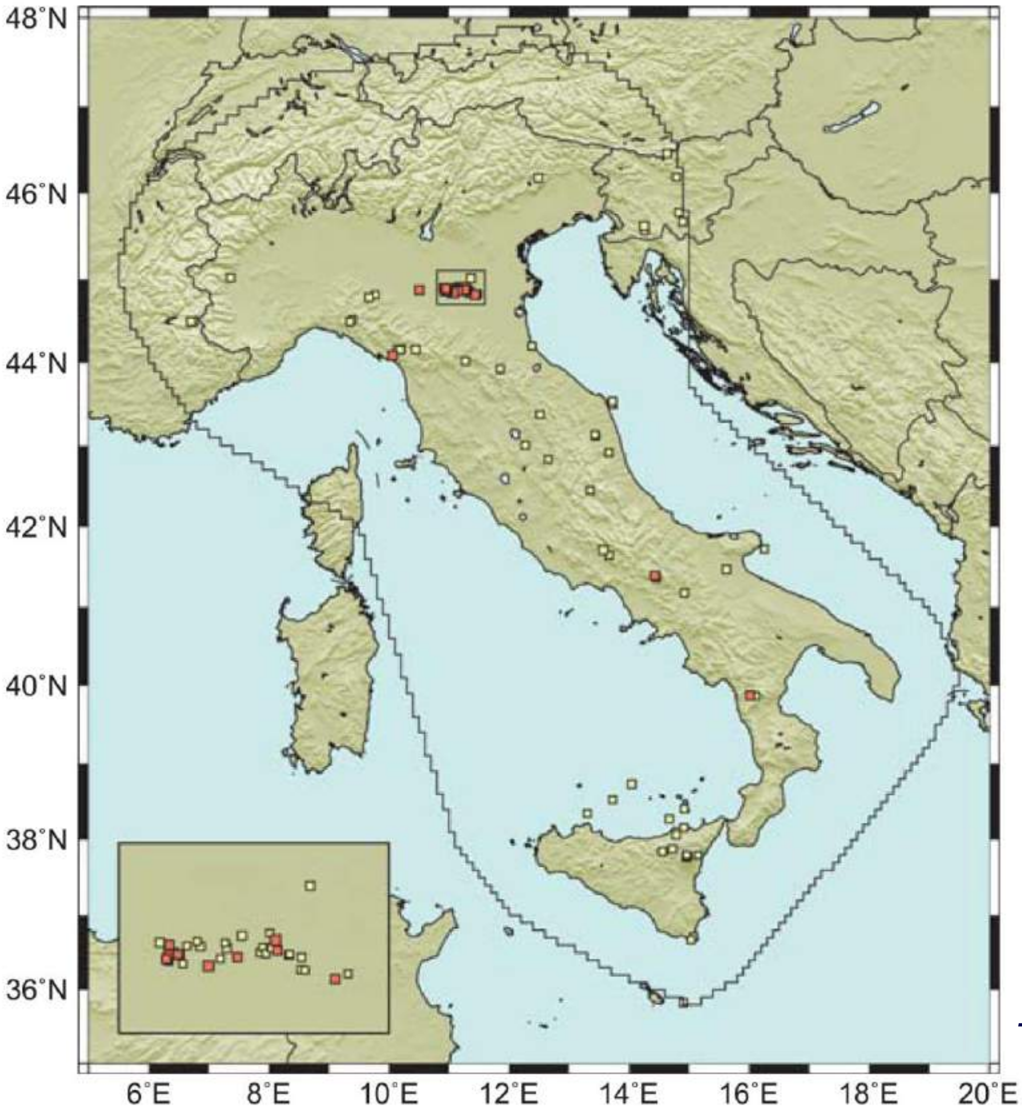
Outline of the talk

- CSEP Italy Results
- The importance of CSEP in OEF
- OEF in Italy, new perspectives

CSEP Italy Results



Test

Time: 1 August 2009 – 31 July 2014
1-day forecasts: 1826
Space: Italy inside the black area
Target events (M 3.95+): 97

Model Submitted

ETAS LM
ETES FMC
STEP NG
STEP LG

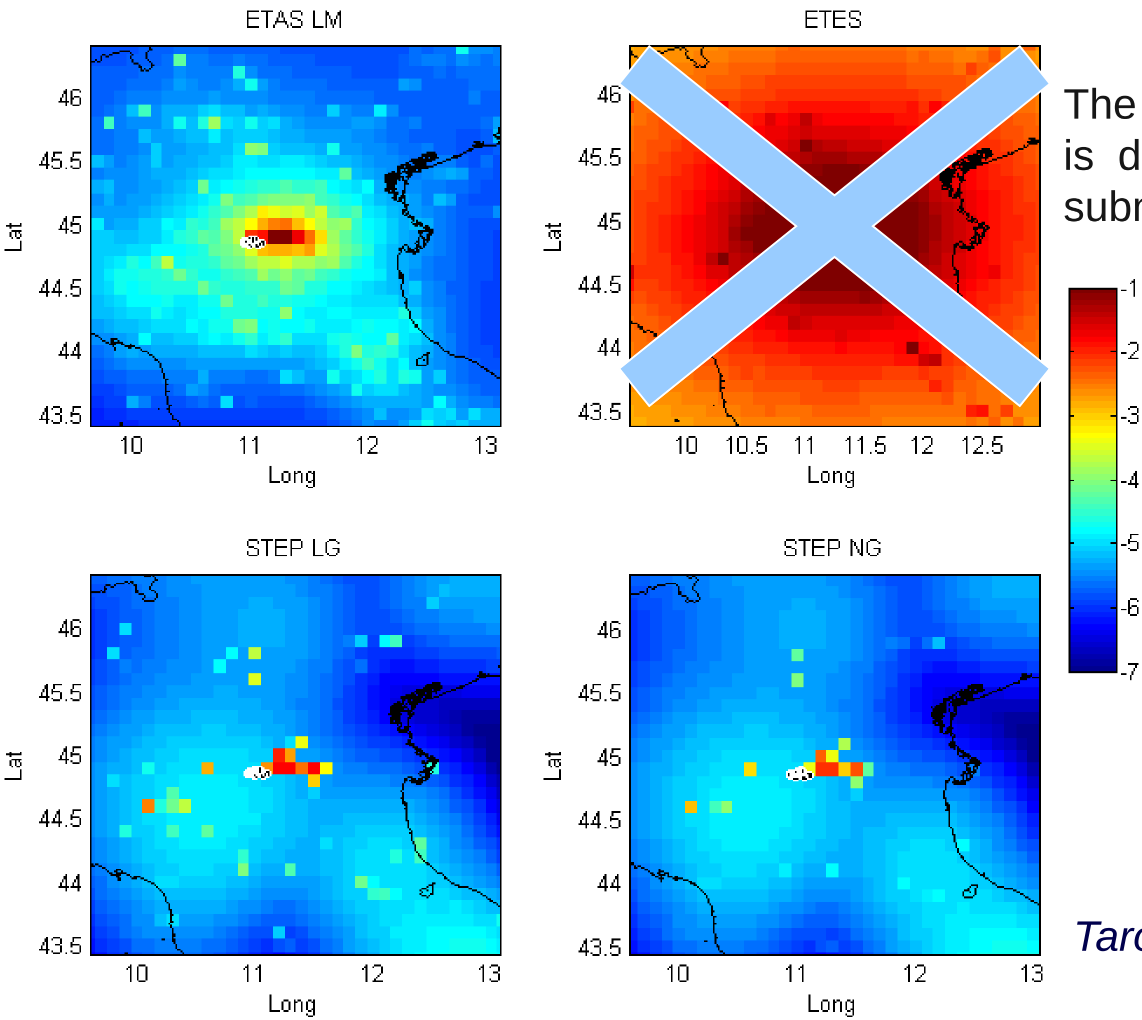
Sequence

2012 Emilia Romagna

Taroni et al. (2018)

CSEP Italy Results

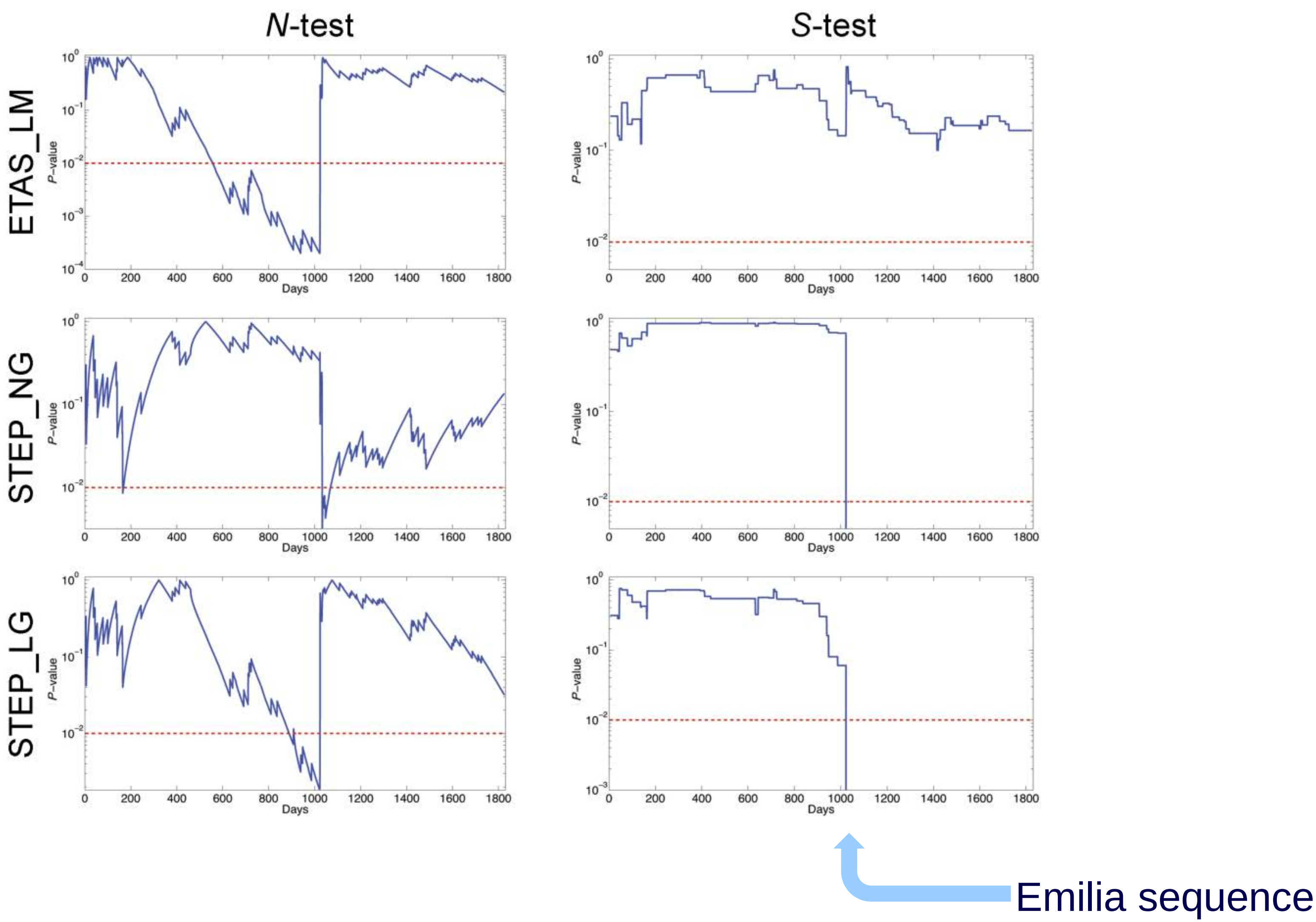
One-day forecasts for 29 May 2012



The overprediction of the ETES model is due to a bug in the software code submitted in the test center.

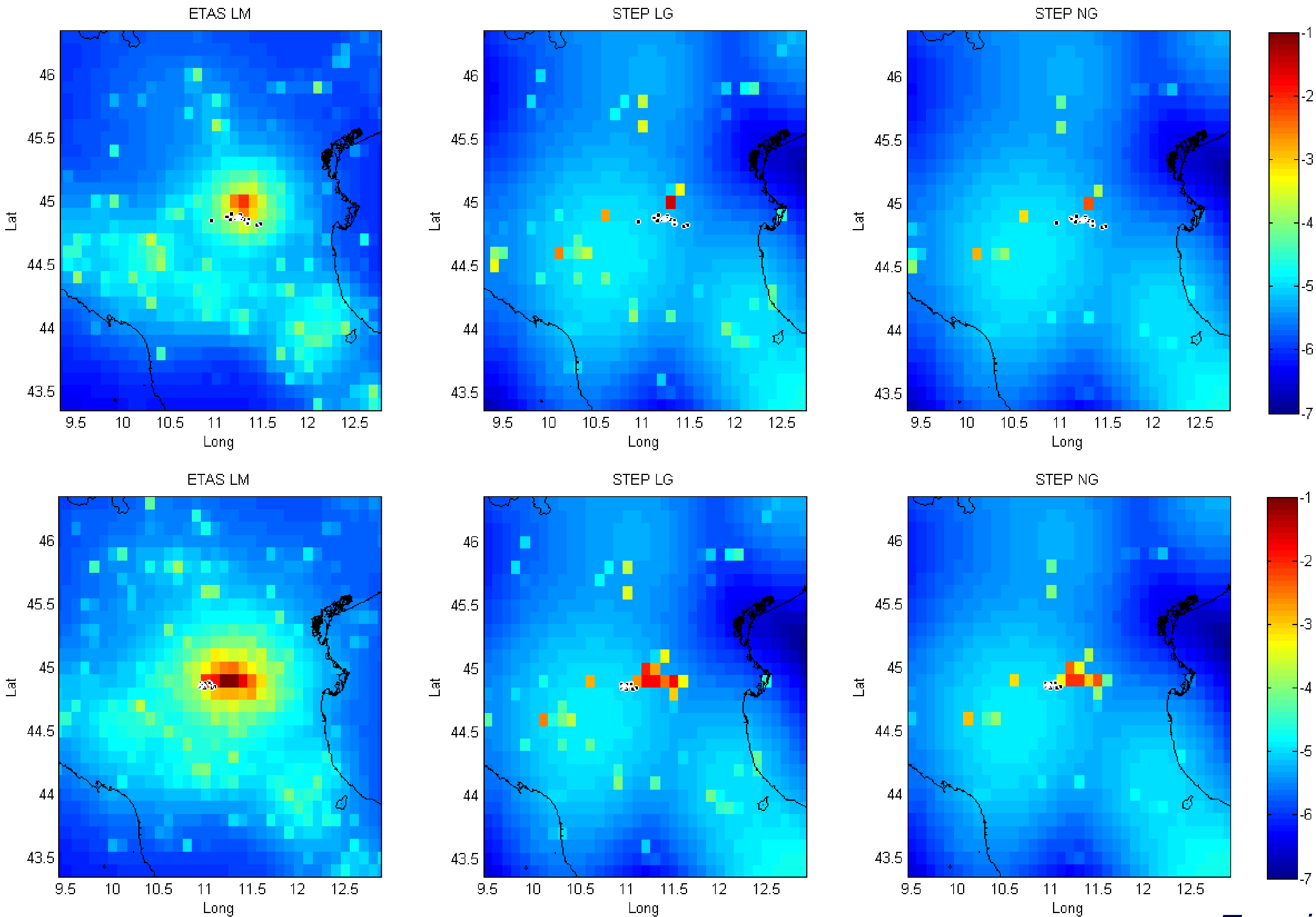
Taroni et al. (2018)

CSEP Italy Results



Taroni et al. (2018)

CSEP Italy Results

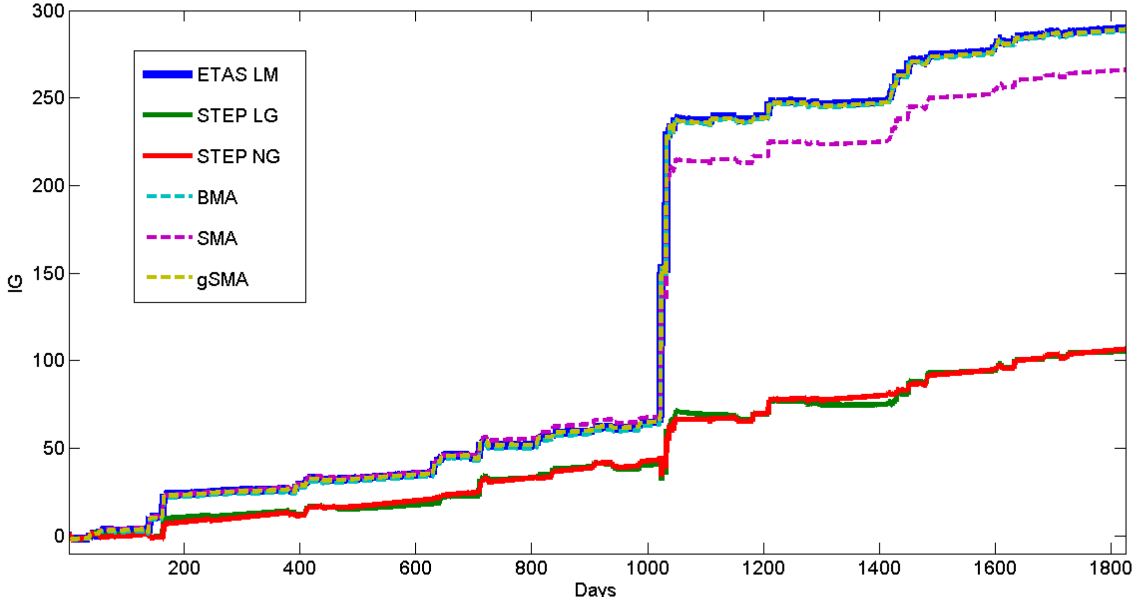


May, 20 2019
Mw 6.1

May, 29 2019
Mw 5.9

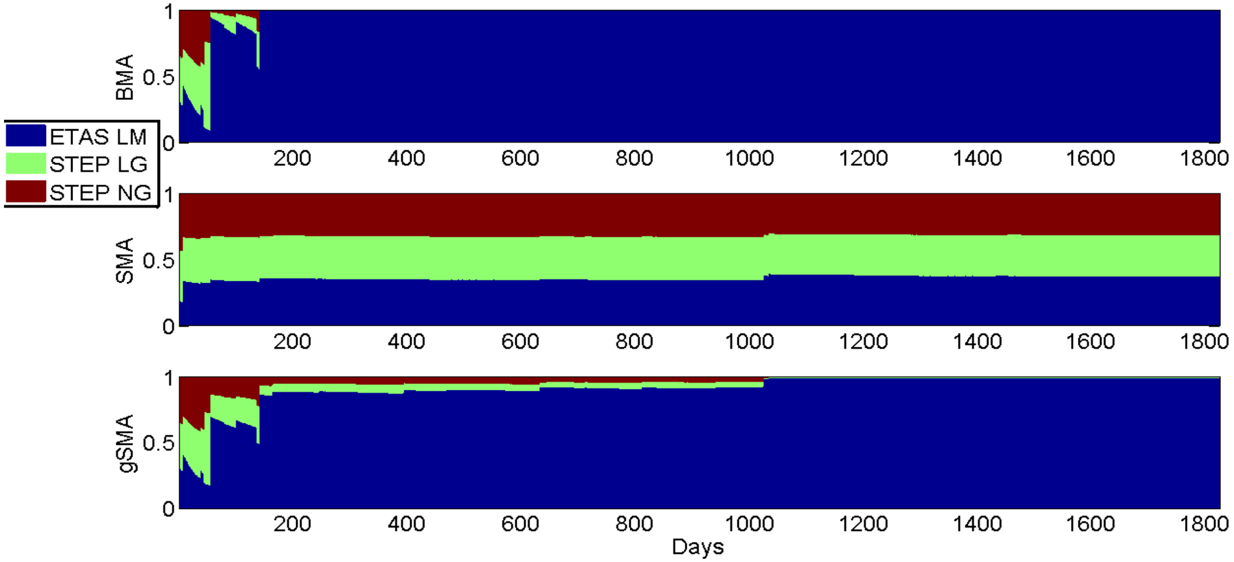
Taroni et al. (2018)

CSEP Italy Results



ensemble models

Cumulative information gain



Weight of each model as function of the time

Taroni et al. (2018)

The importance of CSEP in OEF Italy

The importance of CSEP in OEF Italy

ANNALS OF GEOPHYSICS, 53, 3, 2010; doi: 10.4401/ag-4848

The ETAS model for daily forecasting of Italian seismicity in the CSEP experiment

Anna Maria Lombardi[1,*] and Warner Marzocchi[1]

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Article history
Received October 30, 2009; accepted August 16, 2010.
Subject classification:
Earthquake probability, Forecasting, Italian seismicity, Hypothesis test, Aftershocks.

ANNALS OF GEOPHYSICS, 53, 3, 2010; doi: 10.4401/ag-4812

Building self-consistent, short-term earthquake probability (STEP) models: improved strategies and calibration procedures

Jochen Woessner[1,*], Annemarie Christophersen[1,3], J. Douglas Zechar[1,2], Damiano Monelli[1]

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[2] Lamont-Doherty Earth Observatory, Columbia University, Palisades, NY, USA
[3] GNS Science, Avalon, Lower Hutt, New Zealand

Article history
Received October 23, 2009; accepted April 13, 2010.
Subject classification:
Earthquake statistics, Earthquake forecasting, Likelihood testing, Aftershock model, Seismicity analysis.

ANNALS OF GEOPHYSICS, 53, 3, 2010; doi: 10.4401/ag-4760

Short-term and long-term earthquake occurrence models for Italy: ETES, ERS and LTST

Giuseppe Falcone[1,*], Rodolfo Console[1], Maura Murru[1]

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Article history
Received October 1, 2009; accepted April 22, 2010.
Subject classification:
Earthquake interactions and probability, Statistical analysis, Stress, Historical seismology, Earthquake faults.

No singles models are used!

ENSEMBLE forecasting model. Each model is **weighted** according to its **forecasting performances**)

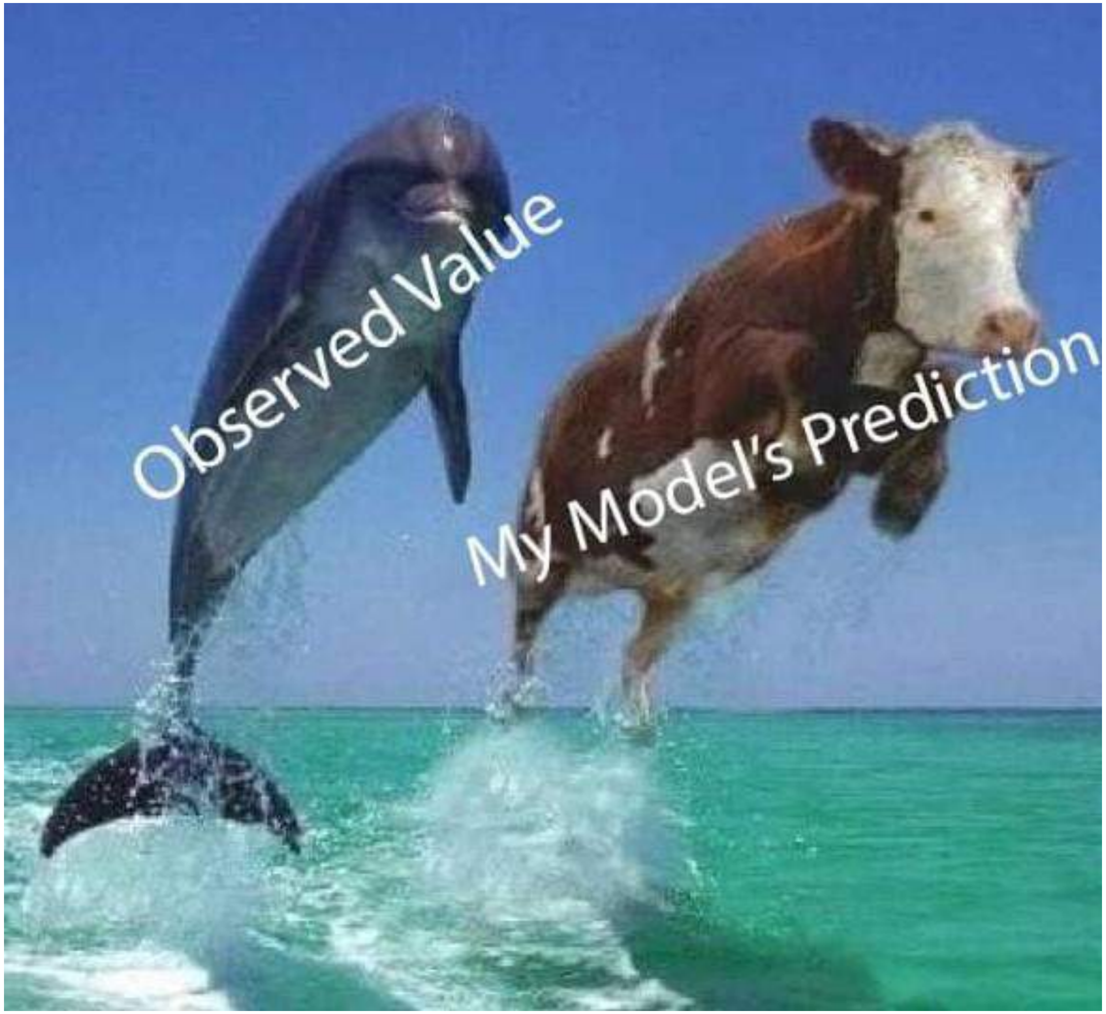
Selected models (constraints)

The models must be submitted to at least one **CSEP experiment.**

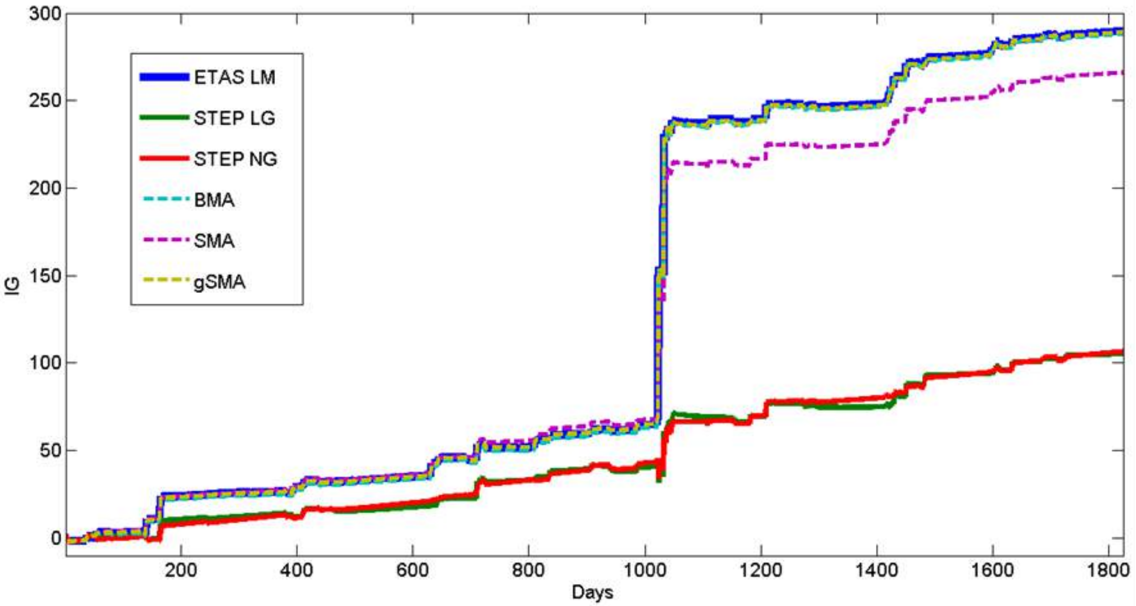
The test in CSEP experiment indicates the scientific robustness of these models for the potential uses in operational earthquake perspective.

The importance of CSEP in OEF Italy

The OEF without the CSEP …..



The importance of CSEP in OEF Italy

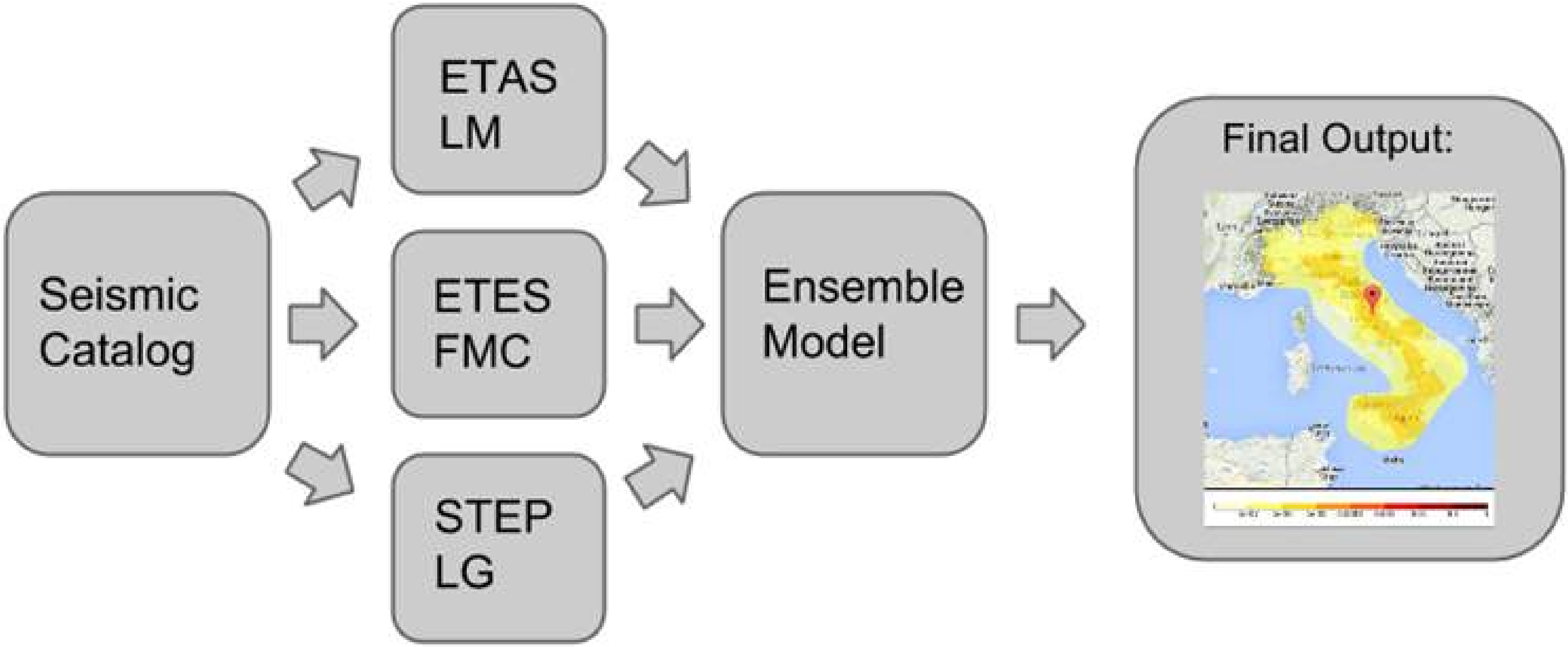


Ensamble models

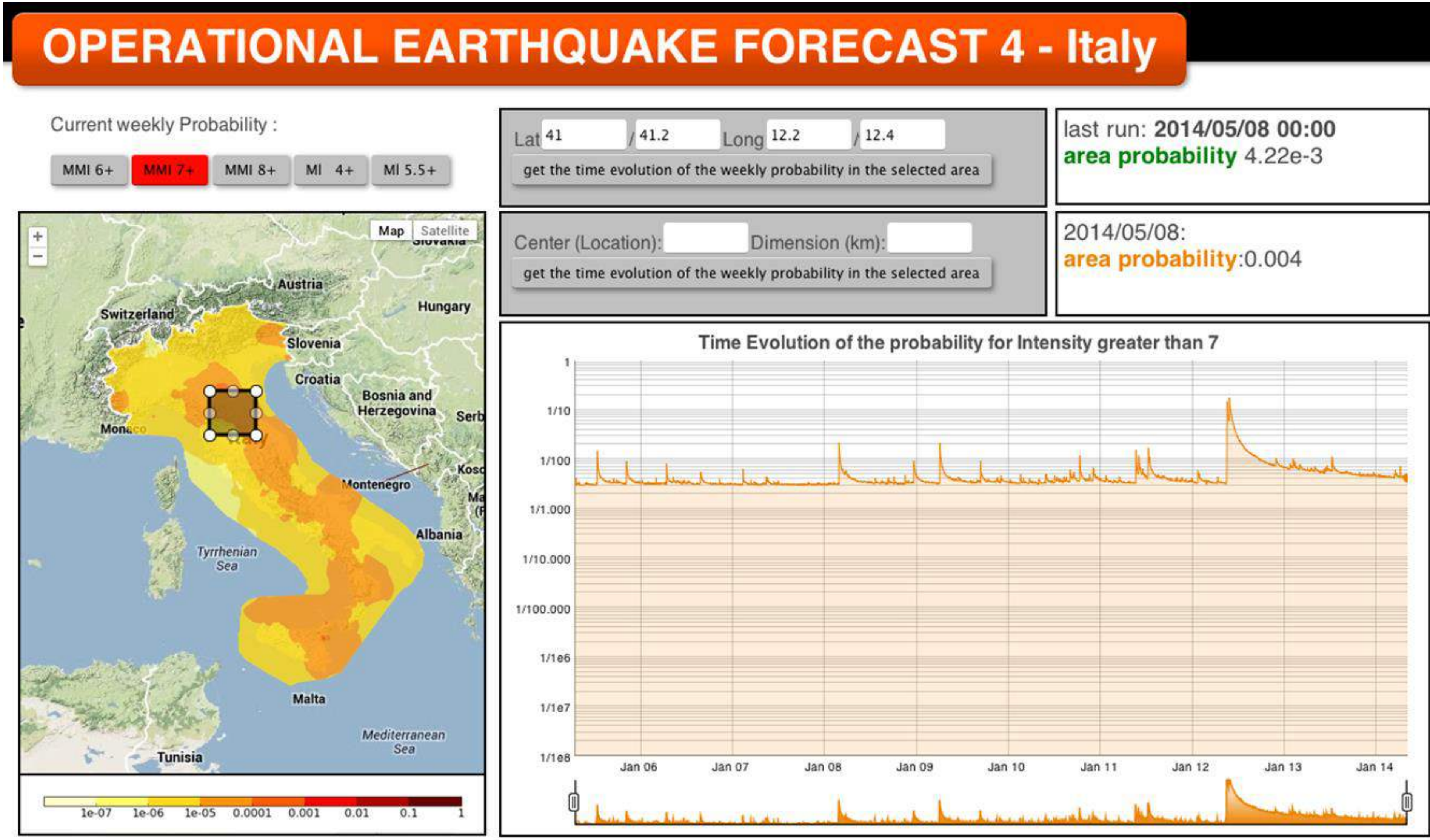
The ensemble models perform well in the 1-day testing class; the pass the N- and S-Test and show IG comparable to the best performing model (ETAS_LM)

OEF in Italy, new perspectives

OEF in Italy, new perspectives



OEF in Italy, new perspectives



OEF products

Every day at midnight:

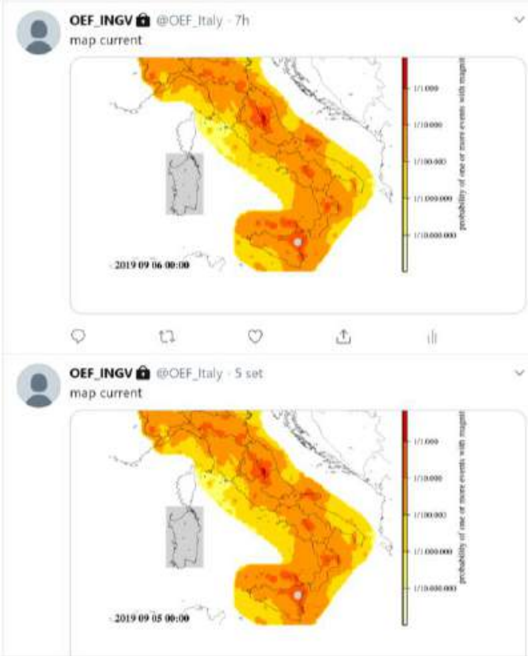
- calculates the weight of the model with the seismicity occurred in the previous week;
- provides the new probability (Ml 4+, Ml 5.5+, MMI 6+, MMI 7+, MMI 8+) values for the next week;
- send the map with the probability of one or more events with Ml 4+ in a private tweet

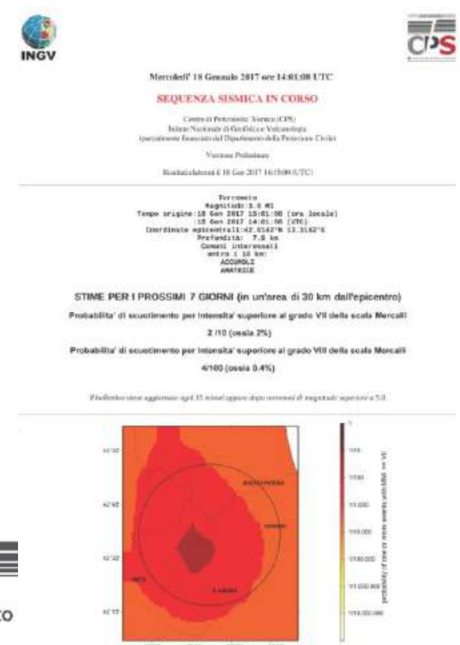
When occurred an event with Ml 3.5+:

- provides the new probability (Ml 4+, Ml 5.5+, MMI 6+, MMI 7+, MMI 8+) values for the next week;
- send the map with the probability of one or more events with Ml 4+ in a private tweet

When occurred an event with Ml 5.0+:

- provides the new probability (Ml 4+, Ml 5.5+, MMI 6+, MMI 7+, MMI 8+) values for the next week;
- send the map with the probability of one or more events with Ml 4+ in a private tweet
- send an email with an pdf attached (earthquake notification report)



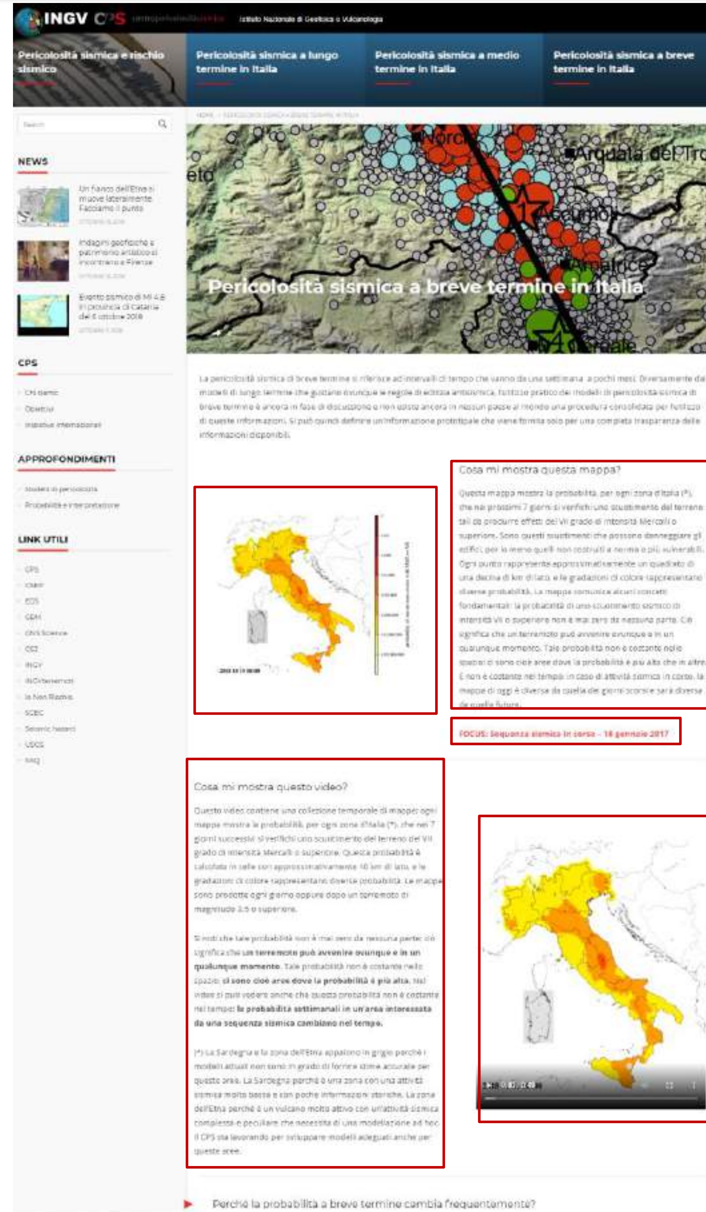


OEF in Italy, new perspectives

In the 2020 the map will be public and posted in a dedicated webpage. In the page will be present:

- a Italian map with the probability of one or more events with Ml 4+;
- a video that shows the evolution of the probability (starting from 1 January 2018 up to last map created for the system);
- A link for the earthquake notification report for the events with Ml 5.0+;
- a section about the information that the map and video provide.

In this moment the webpage is evaluated to check the impact of the information to different level of the society (housewives, workers, students, researchers ecc…..).



OEF in Italy, new perspectives

Future work:

CSEP

- test the models for the period 2014-2019;
- introduce new testing tool (RISE Project);
- develop new earthquake forecast models (RISE Project);

OEF

- synthetic events replishment in the hours after the mainshock (incompleteness catalog);
- insert new models in the ensemble;
- change the actual model weight procedure (from SMA to gSMA or BMA);
- insert in result of the hybrid model the uncertainties to each single model;
- migrate all system code in Python and sharing it in GitHub.

Thanks for your attention