SSM
Scuola Superiore Meridionale

Course title:

Fundamentals of Natural Hazard Forecasting

Duration [number of hours]**: 12**

PhD Program [MERC/MPS/SPACE]**: MERC**

Name and Contact details of unit organizer(s):

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Course Description [max 150 words]**:**.

Natural hazard forecasting lies in the so-called Pasteur's quadrant, because it pursues fundamental understanding of the preparatory phase of major natural threats, but with important practical implications in terms of risk reduction for society.
The motivation behind this course is to equip you with the fundamentals of hazard forecasting, which are common across a wide range of natural threats. Starting from real examples, this course will allow you to articulate a complete probabilistic forecast using deterministic/stochastic/empirical modeling of the physical process that stand behind the occurrence of natural threats; set up ensemble models to include different kinds of uncertainty into the forecast, using various probabilistic frameworks; validate forecasting models, testing the consistency of forecasts with independent data; compare the skill of different forecasting models.

Syllabus [itemized list of course topics]**:**

Introducing natural hazard forecasting
Natural hazard forecasting as a scientific enterprise; predictions and forecasts; probabilistic, stochastic and deterministic modeling; the hazard/risk separation principle.

Probabilistic methods for natural hazard forecasting
The nature of uncertainties; uncertainty and probability; the role of subjectivity and objectivity in forecasting models; the Bayesian and the unified probabilistic frameworks; ensemble modeling.

Testing natural hazard forecasts: model validation, and forecasting skill
Basic principles on model consistency and validation; forecasting skill and comparative tests; prospective and retrospective tests.

Assessment [form of assessment, e.g., final written/oral exam, solutions of problems during the course, final project to be handed-in, etc.]**:**

Final project to be handed-in

Suggested reading and online resources:

1. Notes, slides and references will be distributed during the course