Objectives
The goal of the present study is to exploit as much as possible the outcomes of the SIGMA project (Pecker et al., 2017) in order to produce a new seismic hazard map for metropolitan France. SIGMA led to improvement of key “ingredients” of the PSHA: (1) a new seismic catalogue for France has been produced; (2) area source models have been updated with emphasis on fault systems; (3) uncertainties on magnitude-frequency distributions are fully propagated; (4) new GMPEs specific for France have been developed.

Earthquake catalogue

Input data
- FCAT-17 catalogue (Poster by P. Traversa C6- Session1) which is an outcome of SIGMA combining historical events (based on SISFRA.NCE) with re-evaluated hypocentral depth and Mw, with updated location and Mw based on coda analysis of instrumental events (SIFcat catalogue).
- The FCAT-17 catalogue includes events up to 2009 and its geographical extension is limited to a 20 km buffer around French borders and coastlines. Hence the catalogue has been complemented using:
  - The SIEC catalogue for the period 1000-2006
  - The original SIFhex catalogue which covers a greater area for the period 1962-2009
  - The LGD bulletins for the period 2010-2016

SSC model
Area source outcomes
- EDF model (outcomes of SIGMA for the Southwestern part of France)
- RESORCE model (Baize et al., 2013)
- GEOTER model based on large seismotectonic domains following geophysical discontinuities and further sub-divided into area sources

GMC model
Selection of GMPEs
- Pre-selection of 16 GMPEs (NGA2 models, RESORCE models and 2 SIGMA models adapted to the French context)
- Selection based on expert judgment:
  - Ameri (2014, gpreremder)
  - Abrahamson et al. (2015)
  - Caruso et al. (2015) (variable reference vS30 option)
  - Drouet & Cotten (2015) (IUPR)

Analysis of the epicentral uncertainty coverage
- Tentative comparison of the center, body and range of the 4 selected GMPEs versus the pre-selection
  - Twinkle plots
  - Siemens' maps
  - Simple PSHA calibration tests

Conclusions
- A new PSHA model for metropolitan France using as much as possible outcomes of the SIGMA project has been build.
- Compared to the model developed in 2000-2001 (used in MEDD 2002), the level of hazard computed with the 2017 model is much lower.
- On the other hand, preliminary comparison (not presented here) with PSHA models for Switzerland, Italy and Spain showed consistent results. Quantitative comparisons should be performed.
- The analysis of the impact of the Mmax, a-values and b-values distributions on the level of hazard reveals that the b-value is a key parameter.
- This result highlights the need to carefully compute the Mmax models. The CELLS-SSC (2012) project showed that the propagation of magnitude uncertainty may lead to bias in the GR models. This should be further investigated.
- In addition to the work presented several tests were carried out on Bayesian update of the hazard model and on the partially non-ergodic approach.
- Next steps include refinement of the PSHA model in the coming years.