Anthropogenic seismicity workshops

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The complex relationship between the impact of human technological activity, such as the exploitation of geo-resources and the Earth response to that activity, requires a holistic problem based approach, rather than the traditional separation into scientific disciplines. An insight into these relationships can result only from cross-disciplinary studies of technology-nature couplings. A proper analysis of the Earth’s response can only be done with a simultaneous analysis of conditions of the technological activity. One of the challenges related to this, is to educate the researchers and students about anthropogenic seismicity with the state of the art knowledge, tools and data.

To face this challenge the EPOS Thematic Core Service Anthropogenic Hazards (AH) community prepared the Workshop plan of IS-EPOS Platform, which is used in anthropogenic seismicity studies. The latest workshop was conducted at GFZ Potsdam, Germany on May 12 2017 for 18 participants. The IS-EPOS platform is a digital research space for researchers and students, providing permanent and reliable access to advanced research infrastructures.

The platform is available at [https://tcs.ah-epos.eu/](https://tcs.ah-epos.eu/). This environment is designed to ensure freedom for experimentation by providing a virtual laboratory in which the researcher can design their own processing workflows to process the data integrated on the Platform. The IS-EPOS Platform integrates data and specific applications. The data is gathered in the so-called “episodes”, which comprehensively describe a geophysical process, induced or triggered by human technological activity, which may under certain circumstances become hazardous for people, infrastructure and the environment. The heterogeneous multi-disciplinary data (seismic, displacement, geomechanical data, production data etc.) are transformed to unified structures to form integrated and validated datasets. To deal with this multidisciplinary data, problem-oriented applications have been designed and implemented.

The workshop program is developed from experience of conducting...
research with the platform, as well as the uniqueness of the anthropogenic seismicity cases. During the workshops, students acquire basic knowledge on how to conduct research on the IS-EPOS Platform. The integrated access to multidisciplinary data and applications together with the dedicated access to tutorials, dissemination and training tools, enhance the capacity to provide novel services to students. During the workshops participants practice all IS-EPOS workspace functionalities, promoting the use of data in novel way, by providing access to data products and applications offering integrated knowledge and solutions, as well as to social services enabling sharing of the outcomes of research.

They get acquainted with basic applications as: data upload, catalog export from Matlab format to Excel, filtering with date and magnitude, signal download application, work with the seismogram picking tool on the chosen event signals, as well as the more advanced tools as the time-dependent hazard applications spectral analysis and focal mechanism calculations of anthropogenic events. Workshops also provide user’s feedback and foster the development of new ideas for the use of integrated research infrastructure, leading to new insights regarding user requirements.

IS-EPOS Platform is being also used as a teaching tool in Ph. D. students education within Institute of Geophysics PAS seismology course for Ph. D. candidates, Interdisciplinary Polar Studies, as well as in several other anthropogenic hazard workshops for students and young researchers, which had taken place in Poland (Geosciences Student Conference, University of Silesia, AGH University of Science and Technology), Sweden (Lulea University of Technology) and USA (Miami University). The overall number of workshop and Ph. D. study courses participants was about 150 researchers, students of Master and Ph.D. level and industry representatives, which provides promising number of new TCS AH community members from various countries.