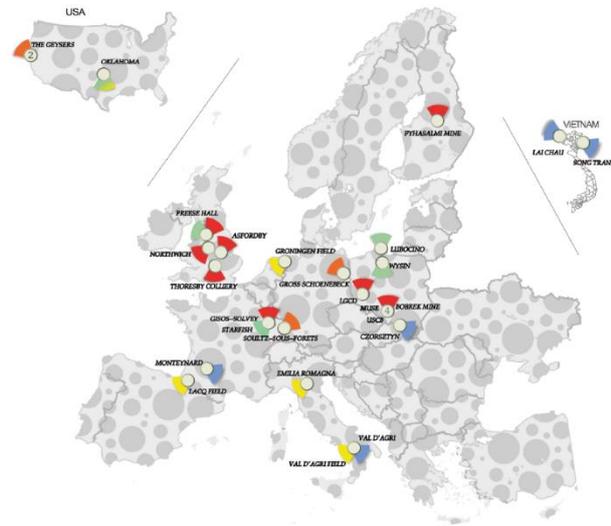




OVERVIEW | OBJECTIVES



EPOS THEMATIC CORE SERVICE ANTHROPOGENIC HAZARDS aims to provide an environment and facilities for conducting research into anthropogenic hazards, especially related to the exploration and exploitation of geo-resources. The key features will be:

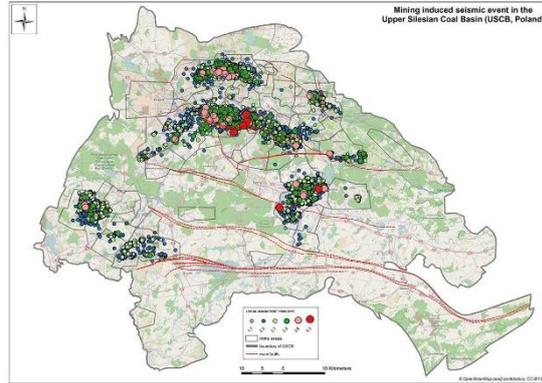
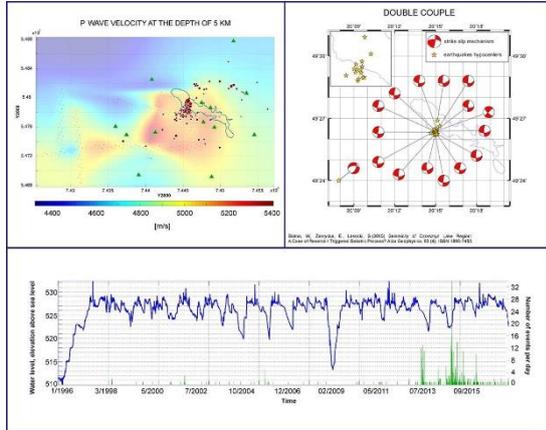
- **Anthropogenic Hazards data and data products** are grouped in *episodes*. These describe a geophysical process which is induced or triggered by human activity during exploration and/or exploitation of geo-resources and could be hazardous for people, infrastructure, and/or the environment. Each episode integrates seismic and production/technological data, supplemented with any other geo-data available (geological, geophysical, tectonic, geomechanical, geodetic, etc).
- **A Flexible Computational Platform** providing resources to allow
 - 1) design of problem-based workflows using a combination of the TCS online software library, and personal software and IT resources;
 - 2) computationally demanding analysis through access to High Performance Computing Resources;
 - 3) storage of data, data products and results of analysis in a personal workspace area;
 - 4) visualisation of all types of TCS AH data, data products and analysis results.
- **Problem-oriented, bespoke applications** to investigate links between technology, geophysical response and any resultant hazard. Access to application packs for a variety of purposes, including:
 - Multi-hazard simulator for multi-hazard/multi-risk assessment of the exploration and exploitation of geo-resources;
 - Exploring the interaction between technology operations and seismic deformation;
 - Geophysical data analysis;
 - Quantitative probabilistic assessments of anthropogenic seismic hazards;
 - Outreach, dissemination, and communication.
- **Collaborative platform** for social interaction, including calls for projects, common workspace areas and communication tools.

TCS AH is a development of the IS-EPOS Platform for Anthropogenic Seismicity Research (<https://tcs.ah-epos.eu>), a result of the Polish national project "IS-EPOS: Digital Research Space for EPOS Purposes" co-financed by the European Regional Development Fund in 2013-2015. IS-EPOS Platform is a prototype of TCS AH. TCS AH is being developed by 14 European research institutions in the framework of the work package WP14 of EPOS IP.





APPLICATIONS

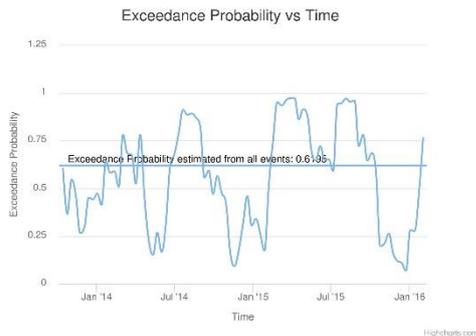


Episode: Upper Silesian Coal Basin (USCB)

Episode: CZORSZTYN

TCS AH provides access to software dealing with specified scientific problems, designed in the area of anthropogenic hazards. All of these applications consist of software packages and visualization tools, both applied to selected data subsets that a user has pre-defined and uploaded to the personal workspace. The users have therefore the possibility to proceed to either episode-oriented research (application of various methodologies focusing on a particular episode), or method-oriented research (perform a certain methodology at several datasets in order to compare results with each other and test the efficiency of selected approaches).

USE CASE



Hence the episodes and all scientific analysis in field of the anthropogenic seismicity require technological data describing the inducing process, one of the use cases is to prepare time-dependent seismic hazard analysis. Such analysis can be prepared with one of the applications on IS-EPOS platform. This application can be performed for all episodes. The most suitable example is the way how it functions with episodes associated with mining induced seismicity. Its purpose is

to evaluate the temporal evolution of the seismic hazard parameters and therefore to detect a causative relationship between seismic events and production/technology activity in case of mining it is namely a causative relationship between seismic events and mining front advance. Hazard parameters estimated are the activity rate, the Gutenberg-Richter b-value, the return period and the exceedance probability of a prescribed magnitude for selected seismically time windows related with the advance of the mining front. Two options are available for creating time windows: Constant time period (duration of dataset) and constant event number (dataset size). The spatial constraints are set by defining a specify circular, rectangular or polygonal area. Four magnitude distribution estimation methods are supported. Hazard parameters are calculated and plotted for each one of the time windows for which sufficient data are available. A result of time dependent hazard parameters in mining environment is shown on picture.

CONTACT

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