

# **Minutes of the PREPARED Mid-Term Meeting, Reykjavik, Iceland, January 30-31, 2004**

**Friday, January 30 from 08:30 to 18:30**  
**Saturday January 31 from 09:00 to 13:00**

The programme of the mid-term meeting was twofold:

- 1) A reporting on progress in the various workpackages, to see if the partners were fulfilling their expectations given in the workprogramme, the deliverables, etc. To discuss what more was needed to do to fulfill what we had promised in individual workpackages. And what was even more significant, how were we going to proceed with the individual workpackages to achieve the general goals of PREPARED.
- 2) To lay the path for the work during the later half of the project. In this part integration of the various workpackages was critical to achieve the goals that we aimed to achieve, which were practical applications mainly based on the experience of the 2000 earthquakes to mitigate risks.

**These are the goals that we aim to achieve according to the PREPARED workprogramme:**

**What we aim to achieve.** The role of earth sciences in mitigating seismic risk is manifold. We try to provide (time independent) probabilistic hazard assessment, time dependent hazard assessment, short-term warnings and early warnings or “nowcasting”. The basic purpose of all these information or warnings is to assess as well as possible the exact location, and surface effects of the impending earthquake.

**Improving probabilistic hazard assessment.** By precise mapping of numerous activated faults, by various observed surface effects and by modelling with earth realistic parameters we will make the hazard assessment more detailed as concerns the place and effects. This involves to forecast ground motion for preventive actions and engineering application. The results of the EC “Strong Ground Motion Estimates” project (ENV4-CT96-0296) can also contribute significantly here, besides the Icelandic experience.

**Time-dependent hazard assessments and warnings.** Earthquake prediction informing with useful precision about all aspects of an impending earthquake is hardly on the agenda. Based on our experience, however, it is possible in many cases to provide useful information at different times in advance about some aspects of a probably impending earthquake. Judging from experience and availability of tools in Iceland, we think that such warnings can be based on seismological and hydrological data, radon anomalies, strain/deformation observations, as well as earth realistic models of crustal behavior and processes.

We classify our earthquake warnings and time-dependent hazard assessments into several scenarios:

**Years/month in advance.** Useful for concentration of various risk mitigating efforts, finding baseline, increasing research, increasing monitoring and strengthening of structures.

**Weeks/days in advance.** Useful for activating the civil protection and rescue groups, increased earth observations, and raising preparedness of people.

**Hours/minutes in advance.** Everyone involved begins preparing immediately for a hazardous event will occur anytime within a short-time. Such an alarm must have time limit; it must end sometime.

**The earthquake occurs.** Early warning, nowcasting, real-time damage assessment. Usefulness: Assessment based on earlier knowledge as well as from observations of the earthquake used to help people and authorities, civil defence and rescue groups to mitigate the impact on people and society.

**Post-quake information.** To explain the hazardous event and try to assess and warn of further coupled hazards.

**The aim of the project is to apply** the available knowledge and results of earlier research and the new data acquired to enhance the information and warnings given at all these stages.

The various workpackages of the project will aim at concrete results to enhance general hazard assessments, time dependent hazard assessments, short-term warnings and nowcasting (early information) for an impending earthquake. Although this is in first hand valid for mitigating risk in Iceland, the multidisciplinary and physical approach makes the results applicable at many other earthquake prone regions of the world.

**The meeting programme of the mid-term meeting took the abovementioned goals into account. Each speaker had far too short time for a general description of his work as would be requested at a scientific conference. In the light of our goals each speaker had to concentrate on two questions: what had we achieved and how are we going to proceed to achieve more practical tools for fulfilling the goals described above. The meeting was grouped into packages. Last part of each package concentrated on integration of the various workpackages.**

# **MEETING SCHEDULE**

**Friday, January 30, 08:30-18:30**

**Venue: Hotel Loftleidir - Hall 8**

**08:30-08:35**

**Welcome address**

Bardi Thorkelsson

**08:35-09:05 WP 1**

**Introductory overview**

Ragnar Stefánsson and Gunnar B. Gudmundsson: About the state-of-the-art in providing earthquake warnings in Iceland.

**09:05-10:20 WP 2**

**Analysis of multiparameter geophysical data approaching the June 2000 earthquakes, assessing the state of stress**

**09:05-09:20 WP 2.1**

Christian Goltz: Pattern search in multiparameter seismic data.

**09:20-09:35 WP 2.2**

Max Wyss: Seismicity rate and b-values in South Iceland.

**09:35-09:50 WP 2.3**

Thóra Árnadóttir: Long-term deformation in the SISZ inferred by joint interpretation of GPS, InSAR and borehole strain data.

**09:50-10:05 WP 2.4**

Reynir Bödvarsson, Björn Lund and Ari Tryggvason: Space and time variations in crustal stress using microearthquake source information from the SISZ.

**10:05-10:20 WP 2.5**

Stuart Crampin: Using shear-wave splitting above small earthquakes to monitor stress in the SISZ.

**10:20-10:40 COFFEE BREAK**

**10:40-11:15 Discussion. Integration of the WP 2.x workpackages. Opening by Ragnar Stefánsson**

**11:15-12:15 WP 3**

**Short-term changes/precursors**

**11:15-11:30 WP 3.1**

Ragnar Slunga: Foreshocks and development of new warning algorithms.

**11:30-11:45 WP 3.2**

Páll Einarsson: Radon time series for the SISZ.

**11:45-12:15 Discussion. Integration of the WP 3.x workpackages and other approaches. Opening by Ragnar Stefánsson**

**12:15-13:45 LUNCH BREAK**

**13:45-15:15 WP 4**

**A model of the release of the two 2000 earthquakes based on all available observations**

**13:45-14:00 WP 4.1**

Kristín S. Vogfjörð: Source mechanisms and fault dimensions of the June 17 and June 21 earthquakes determined from inversion of teleseismic body waves and mapping of aftershocks.

**14:00-14:15 WP 4.2**

Peter Suhadolc: The June 2000 earthquakes in Iceland: Source modelling using strong motion records and groundshaking scenarios in the SISZ.

**14:15-14:30 WP 4.3**

Páll Einarsson: Fracture maps of the SISZ.

**14:30-14:45 WP 4.4**

Thóra Árnadóttir: Deformation model for the June 2000 earthquakes from joint interpretation of GPS, INSAR and borehole strain data.

**14:45-15:15 Discussion. Integration of the WP 4.x workpackages and other applicable models. Opening by Ragnar Stefánsson**

**15:15-15:35 COFFEE BREAK**

**15:35-17:05 WP 5**

**New hazard assessment/New methods for improving assessment of probable earthquake effects**

**15:35-15:50 WP 5.1**

Sigurlaug Hjaltadóttir: Mapping of subsurface faults in southwestern Iceland with the microearthquakes induced by the June 17 and June 21 earthquakes.

**15:50-16:05 WP 5.2**

Amy Clifton: Mapping and interpretation of earthquake rupture in the Reykjanes peninsula and other surface effects there and in the SISZ.

**16:05-16:20 WP 5.3**

Símon Ólafsson and Ragnar Sigbjörnsson: Study of strong ground motion, acceleration and intensities of the two large earthquakes.

**16:20-16:35 WP 5.6**

Jacques Angelier and Francoise Bergerat: Paleo- and present stress fields and mechanics of faulting.

**16:35-17:05 Discussion. Integration of the WP 5.x workpackages and of other work not presented here. Opening by Ragnar Stefánsson.**

**17:05-17:15 BREAK**

**17:15-18:30 WP 6**

**Modelling and parameterizing the SW Iceland earthquake release and deformation processes**

**17:15-17:30 WP 6.1**

Sandra Richwalski and Frank Roth: Earthquake probability changes due to stress transfer.

**17:30-17:45 WP 6.2**

Maria Elina Belardinelli, A. Antonioli and A. Bizzarri: Fault interaction by dynamic stress transfer.

Maurizio Bonafede and F. Zencher: The role of temperature dependent viscosity in rock-fluid interaction.

**17:45-18:00**

Sigurjón Jónsson: About strain measurements and poroelastic deformation observed by InSAR.

**18:00-18:30 Discussion. Integration of the WP 6.x and comparison with other ideas in modelling the SISZ. Opening by Ragnar Stefánsson.**

**Saturday, January 31, 09:00-13:00**

**Venue: Veðurstofan**

**Meeting Room – 3rd floor**

**Discussion between contractors (or their representatives) on how to finalize the mid-term report.**

**Discussion on cooperation/integration, meeting schedule, etc.**