

**Evaluation of research and professional activity  
of research-oriented institutes of the Czech Academy of Sciences for the  
period 2015–2019**

**Summary Final Report**

**Name of the Institute: Institute of Rock Structure and Mechanics of the CAS, v. i.**

**Evaluated teams and their leaders:**

1. Department of Materials Structure and Properties (Jaroslav Kloužek)
2. Department of Composites and Carbon Materials (Tomáš Suchý)
3. Department of Geochemistry (Martina Havelcová)
4. Department of Seismotectonics (Jiří Málek)
5. Department of Engineering Geology (Filip Hartvich)
6. Department of Neotectonics and Thermochronology (Petra Štěpančíková)

## Part A: Evaluation of the institute

### Strengths:

In general, good age structure; new and progressive research directions, two new laboratories established; reconstruction and modernization of all laboratories, new research equipment; increase in publication activity and quality; broadened international collaborations and visibility; ca. 20% researchers from abroad; monitoring within global and European networks; successful in grant competition; involved large research infrastructure programs; strong engagement in student education.

### Weaknesses:

Some teams too small; low salaries for early-career scientists; too high dependence on external funding hampering long-time research focuses and development of new core competences; international visibility, responsibility and cooperation to be further strengthened.

### Opportunities:

Very good international cooperation, active in attracting young researchers from abroad. The Institute is recently equipped with U-Th/He Thermochronology laboratory being one of the best in Europe in its class; high resolution scanning electron microscope with sample preparation workflow suitable for preparation of biological samples. The recent eruption ongoing in Iceland and the relationships with some institutions from this country will provide additional opportunities for high impact papers and broad visibility.

### Threats:

Individual leaving may cause or have already caused severe problems for small teams; insufficient funding for national infrastructure projects endangers long-lasting monitoring network, e.g. Czech/Geo, RINGEN. Some Departments are too small, which may create future problems.

## Main criterion: 1. Quality of results (H1.1-H1.5)

<b>H1.1</b>	<b>Quality of selected outputs of Phase I</b>
All teams of the IRSM except for Team of Geochemistry presented a good set of research products but below the mean of the field. In average the main contribution is distributed in the Q2 and Q3 with a reduced presence of papers in Q1 and only few in the top decile.	
<b>H1.2</b>	<b>Contribution of workers on the outputs reached</b>
Some papers are presented with only authors from the group. A very few papers are presented with only one author. In general, there are many publications whose first author is a researcher from the group. In general, the majority of the papers presented more than one author of the Institute in the list of authors. All presented publications match with the different research lines of the research teams of the institute	
<b>H1.3</b>	<b>Quality of all outputs and results</b>
Work is generally of good quality. This has been a significant improvement over productivity it was witnessed first evaluation. Some members of the Institute have been awarded with high quality external fellowships.	
<b>H1.4</b>	<b>The most valuable discoveries and findings in the fields, their importance for the field</b>

<p>As a brief list of valuable results, it can be mentioned:</p> <p>Notable outputs on characterization of coal deposits and sedimentary matter; studies of CO<sub>2</sub> capture; mercury and other pollutant analysis of river sediments; mineralogy and geochemistry of uranium ore deposits.</p> <p>Seismic risk, studying faults, hydrological systems affecting them, as well as frailty of slopes adjacent or close to these fractures is important in establishing areas with potential for landslide disasters.</p> <p>Applied engineering, seismic risk, fault study, hydrological and ice weathering systems affecting ground instability are important in establishing areas with potential for landslide disasters.</p> <p>Tectonic geomorphology, structural geology, applied geophysics, paleoseismology, dating, and mineralogical study of fault rocks that contribute to seismic hazard assessment, which is used for evaluation of large civil engineering structures such as nuclear power plants, disposal of radioactive waste.</p> <p>See individual evaluation of every research team to complete this global vision.</p>	
<b>H1.5</b>	<b>Contribution of the participation of the authors in large collaborations</b>
Not applicable	

## Main criterion: 2. Societal relevance (H2.1-H2.5)

<b>H2.1</b>	<b>Societal relevance of outputs and results pursuant to CAS and institute mission</b>
<p>Even if the main topic of the institute is dedicated to applied and basic research, some of the outputs have high societal relevance such as: AV21 contributions, rock and slope instability, neotectonics and seismicity, morphotectonics, rotational seismology and microseismicity monitoring among others.</p>	
<b>H2.2</b>	<b>System functionality for knowledge transfer into practise, its usefulness for society. The impact of the institute's activity on proper practice in society in the area of social sciences and humanities</b>
<p>The different teams presented a set of external projects or contracts with industry, government and non-government organizations. This approach works satisfactorily and there is no need for a more systematic scheme of knowledge transfer.</p> <p>In general, it is remarkable the action focused on the development of new instrumentation and how the potential commercialization Board is established.</p>	
<b>H2.3</b>	<b>Relation to practice</b>
<p>There are practical applications in all the areas evaluated. More details are in the individual evaluations, but it is possible to mention as examples: Monitoring of slope and tectonic processes; seismic hazard of nuclear installations, process for regeneration and/or reactivation of activated carbon among others. Successful efforts to commercialize the results of research (5 patents, 38 applications). The proportion in income is 18-30 %.</p>	
<b>H2.4</b>	<b>Participation in AV21 strategy</b>
<p>Great activity from several teams, in particular in Natural Hazards; dust particles and sources of atmospheric pollution, "Atlas of Dust Particles". More details can be found in the individual evaluations.</p>	

<b>H2.5</b>	<b>Cooperation with regions of the Czech Republic</b>
The cooperation procedure is well developed and mainly focused in the actions associated with hazards of different types. There is a large list of institutions and collaborators in the individual reports.	

### Further criterion: 1. Position in international and national context (D1.1-D1.3)

<b>D1.1</b>	<b>Comparison of the teams and the institute with similar international and national institutes</b>
In general, the quality of the teams can be considered in the average of any international comparison. Well visible but proportion of Q1 publications could be improved. Potential capability to move up in this position.	
<b>D1.2</b>	<b>Scope and quality of international and national cooperation and the role of the institute in such cooperation; engagement in broad international cooperation</b>
Very broad national and international engaged cooperation; operating/administrating of a large number of important European Research Infrastructure (e.g., Czechgeo/EPOS). In the individual reports this topic is mentioned with details. In general, the coordination and collaboration with similar teams of the CAS is done, but not fully developed.	
<b>D1.3</b>	<b>Participation of the workers in scientific community activities (organizing of conferences and workshops, invited lectures, awards)</b>
There is a very large list of conference/workshop events organized or co-organized; educational films, recognized periodicals and books published by the institute and summer schools organization. In the individual report of each team additional details can be found.	

### Further criterion: 2. Vitality, sustainability and strategy (D2.1-D2.9)

<b>D2.1</b>	<b>Direction in line with the perspective of the planned research directions</b>
In general, all teams present continuing traditional research domains but stronger attenuation to new developments; small in-house projects intended to test new ideas and methods. Steady growth of outputs is apparent. With renovated building, laboratories and better-defined research expectations, the Institute should provide more significant applied results in its future.	
<b>D2.2</b>	<b>Assessment of the previous research objectives and their achievement</b>
Applied and pure science was average previously, and improvement is duly noted since the first evaluation.	
<b>D2.3</b>	<b>Assessment of implementation of recommendations from past evaluation</b>
Successful; new partnerships with several international institutions; EU grant not yet attempted but intended to apply for.	
<b>D2.4</b>	<b>Success in receiving grants</b>

Quite successful. During the first years of the evaluated period is observed a decrease of the funded projects. This tendency has been inverted towards an evident growing in the recent years. EU project and grants must be applied frequently.	
<b>D2.5</b>	<b>Adequacy of instrumental equipment</b>
Very good to excellent after extended restauration and modernization. Potential for development of the new equipment.	
<b>D2.6</b>	<b>Effectiveness of management</b>
Effective, within the financial limits. Not always clear for other aspects, for example in the Engineering or Seismotectonic Department is unclear (see specific evaluation).	
<b>D2.7</b>	<b>Assessment of professional structure, development strategy and the strategy of keeping best scientists, age structure, career and qualification growth</b>
Age structure is good and promising for the future; several keys for motivation of scientists were developed; good success in hiring scientists from abroad (20%) but problems to keep them (mainly low salary); sustainable size of small teams to be established. There is a motivation for career growth.	
<b>D2.8</b>	<b>Creating work-life balance conditions, assessment of approach towards possible gender issues</b>
As with many institutes in ČAV, especially shown in the first evaluation, under-represented among researchers are women. This has improved, and managers are aware of the problem.	
<b>D2.9</b>	<b>Relation of the institute with regard to the integration, development and sustainability of the research centre funded by the National Programme of Sustainability II.</b>
Not applicable	

### Further criterion: 3. Cooperation with universities and participation in education (D3.1-D3.6)

<b>D3.1</b>	<b>Scope of cooperation with universities on national and international level</b>
Already very good, but further international extension is recommended. Broad cooperation with universities in the Czech Republic and abroad. See each independent evaluation to obtain the list of Universities.	
<b>D3.2</b>	<b>Effectiveness of joint research centres</b>
In some aspect is very good, as for example World Centre of Excellence on Landslide Disaster Reduction (awarded by UNESCO) with improvable visibility; LAM and Sorption and Porosimetric Analysis Laboratory are not operated by the evaluated teams. On the other hand, there is an apparent official relationship with other centres or departments from CAS.	
<b>D3.3</b>	<b>Success rate in supervision of PhD students</b>
In relationship with the number of researchers of the whole Institute is apparently high. However there is non-uniformity among the different teams, and in some cases this ratio can be improved. See independent evaluations.	

<b>D3.4</b>	<b>Participation of PhD students in the outputs</b>
Same comment than in D3.3	
<b>D3.5</b>	<b>Participation of the institute in master or bachelor studies</b>
There is a considerable participation in different Universities from the Czech Republic but also abroad. In the individual evaluations it is possible to obtain the whole list of this participation.	
<b>D3.6</b>	<b>Assessment of cooperation intensity with universities in the form of teaching</b>
See D3.5	

#### Further criterion: 4. Outreach activities (D4.1-D4.3)

<b>D4.1</b>	<b>Sufficiency of media strategy and activities in the area of research popularisation</b>
The institute has a very high and imaginative set of actions associated to this topic but performed in an apparent way for each Team (see independent evaluation). It is not observed a joint program leader by the Institute itself to promote a solid uniform action.	
<b>D4.2</b>	<b>Publishing activities and its quality</b>
The ratio according the number of researchers is very high, e.g. 110 outputs in popular journals, 66 live programs in TV broadcasts + publisher of Acta Geodynamica et Geomaterialia and co-publisher of Ceramics – Silikáty.	
<b>D4.3</b>	<b>Participation in professional organisations in the area of research and development</b>
Each Team is working in an independent way to participate in professional organizations, with different level of success that in average is very good.	

#### Other comments of the commission:

The IRSM is an important institute of the CAS with long tradition but also good perspectives. Natural Sciences and Engineering and Technology appear, however, quite separate and it may be disputed if they should stay together in one institute. The latter, despite their leading involvement in international research infrastructure, should try to increase their visibility by publication strategy and responsibility in international science organizations and to increase participation in international research projects.

## Part B: Evaluation of teams

### 1. Department of Materials Structure and Properties

#### Strengths:

New research directions and facilities, good publication activity, improved international cooperation, modern infrastructure

#### Weaknesses:

Small team, few young researchers

#### Opportunities:

New and socially important fields of research

#### Threats:

Few young researchers 9 but successful recruitment of new PhDs

#### Main criterion: 1. Quality of results (H1.1-H1.5)

<b>H1.1</b>	<b>Quality of selected outputs of Phase I</b>
Good quality of outputs (53 papers in IF journals, 3 books)	
<b>H1.2</b>	<b>Contribution of workers on the outputs reached</b>
Very good contribution of workers in the outputs	
<b>H1.3</b>	<b>Quality of all outputs and results</b>
Relatively good quality of the outputs (about average for the field)	
<b>H1.4</b>	<b>The most valuable discoveries and findings in the fields, their importance for the field</b>
Work on vitrification of nuclear wastes and on processing of waste materials	
<b>H1.5</b>	<b>Contribution of the participation of the authors in large collaborations</b>
not applicable	

#### Main criterion: 2. Societal relevance (H2.1-H2.5)

<b>H2.1</b>	<b>Societal relevance of outputs and results pursuant to CAS and institute mission</b>
Very socially important research on vitrification of nuclear waste materials and on processing of wastes	
<b>H2.2</b>	<b>System functionality for knowledge transfer into practise, its usefulness for society. The impact of the team's activity on proper practice in society in the area of social sciences and humanities</b>

The results are highly important for the future of the planet. They are highly applicable in practice.	
<b>H2.3</b>	<b>Relation to practice</b>
Close cooperation with Kladno, collaboration with Best Business A.S.	
<b>H2.4</b>	<b>Participation in AV21 strategy</b>
The team effectively participates in AV21 strategy	
<b>H2.5</b>	<b>Cooperation with regions of the Czech Republic</b>
Active cooperation with Kladno region	

### Further criterion: 1. Position in international and national context (D1.1-D1.3)

<b>D1.1</b>	<b>Comparison of the team with similar international and national institutes</b>
The team is comparable with similar national and international teams	
<b>D1.2</b>	<b>Scope and quality of international and national cooperation and the role of the team in such cooperation; engagement in broad international cooperation</b>
Active collaboration with institutions from the US and Japan (PNNL, US DOE ORP, TITFCH)	
<b>D1.3</b>	<b>Participation of the workers in scientific community activities (organizing of conferences and workshops, invited lectures, awards)</b>
Participation in international editorial boards and in the organization of national and international conferences, 6 invited lectures	

### Further criterion: 2. Vitality, sustainability and strategy (D2.1-D2.9)

<b>D2.1</b>	<b>Direction in line with the perspective of the planned research directions</b>
Very good direction of research	
<b>D2.2</b>	<b>Assessment of the previous research objectives and their achievement</b>
Good agreement between objectives and results	
<b>D2.3</b>	<b>Assessment of implementation of recommendations from past evaluation</b>
Very successful implementation of recommendations, in particular successful increase of international cooperation	
<b>D2.4</b>	<b>Success in receiving grants</b>
Problems with application for international grants because of small size of the team	
<b>D2.5</b>	<b>Adequacy of instrumental equipment</b>
Good quality equipment	
<b>D2.6</b>	<b>Effectiveness of management</b>



Very effective management	
<b>D2.7</b>	<b>Assessment of professional structure, development strategy and the strategy of keeping best scientists, age structure, career and qualification growth</b>
Rather small team, few young researchers	
<b>D2.8</b>	<b>Creating work-life balance conditions, assessment of approach towards possible gender issues</b>
Small size of the team creates problems e.g. In case of maternity leaves	
<b>D2.9</b>	<b>Relation of the team with regard to the integration, development and sustainability of the research centre funded by the National Programme of Sustainability II.</b>
Good perspectives of such relations – the research field is extremely important for sustainability	

### Further criterion: 3. Cooperation with universities and participation in education (D3.1-D3.6)

<b>D3.1</b>	<b>Scope of cooperation with universities on national and international level</b>
Active cooperation with universities from the UK, France, Turkey, Egypt, Bulgaria and Slovakia	
<b>D3.2</b>	<b>Effectiveness of joint research centres</b>
No information on this subject	
<b>D3.3</b>	<b>Success rate in supervision of PhD students</b>
Fairly good success in supervision (2 defended PhD theses)	
<b>D3.4</b>	<b>Participation of PhD students in the outputs</b>
Very good degree of participation (some PhD students are first authors)	
<b>D3.5</b>	<b>Participation of the team in master or bachelor studies</b>
Fairly active participation	
<b>D3.6</b>	<b>Assessment of cooperation intensity with universities in the form of teaching</b>
Moderate intensity of cooperation (Prague), understandable in view of the size of the team	

### Further criterion: 4. Outreach activities (D4.1-D4.3)

<b>D4.1</b>	<b>Sufficiency of media strategy and activities in the area of research popularisation</b>
Active participation in schools for students, open days, Science Fair	
<b>D4.2</b>	<b>Publishing activities and its quality</b>
Good publishing activity (53 papers in IF journals, 3 books, 1 chapter in a book)	

<b>D4.3</b>	<b>Participation in professional organisations in the area of research and development</b>
Cooperation with Best Business A.S.	

**Other comments of the commission:**

The Commission suggests efforts to increase the number of the PhD students.

## 2. Department of Composites and Carbon Materials

### Strengths:

Multidisciplinary team, good international cooperation

### Weaknesses:

Small team, problems with funding

### Opportunities:

Good international activity

### Threats:

Relatively old staff, few young researchers

### Main criterion: 1. Quality of results (H1.1-H1.5)

<b>H1.1</b>	<b>Quality of selected outputs of Phase I</b>
Good quality research (43 papers in IF journals, 2 books, 2 chapters in books)	
<b>H1.2</b>	<b>Contribution of workers on the outputs reached</b>
There is strong contribution of workers in the outputs.	
<b>H1.3</b>	<b>Quality of all outputs and results</b>
Good quality of outputs	
<b>H1.4</b>	<b>The most valuable discoveries and findings in the fields, their importance for the field</b>
Very important results in the field of materials for implants and bone repairs (patent), as well as materials for controlled elution of antibiotics	
<b>H1.5</b>	<b>Contribution of the participation of the authors in large collaborations</b>
Not applicable	

### Main criterion: 2. Societal relevance (H2.1-H2.5)

<b>H2.1</b>	<b>Societal relevance of outputs and results pursuant to CAS and institute mission</b>
Research fields concern very important and promising areas (materials for bone repairs, functional materials).	
<b>H2.2</b>	<b>System functionality for knowledge transfer into practise, its usefulness for society. The impact of the team's activity on proper practice in society in the area of social sciences and humanities</b>
High importance of research for society needs in the field of medicine	
<b>H2.3</b>	<b>Relation to practice</b>
Very good relation to practice (18 applications, 1 patent)	

<b>H2.4</b>	<b>Participation in AV21 strategy</b>
The team actively participates in AV21 strategy actions.	
<b>H2.5</b>	<b>Cooperation with regions of the Czech Republic</b>
Active participation in joint projects with Czech institutions	

#### Further criterion: 1. Position in international and national context (D1.1-D1.3)

<b>D1.1</b>	<b>Comparison of the team with similar international and national institutes</b>
The team is comparable with similar international teams.	
<b>D1.2</b>	<b>Scope and quality of international and national cooperation and the role of the team in such cooperation; engagement in broad international cooperation</b>
Effective international cooperation (Italy, Russia, the US, Germany, Switzerland, the Netherlands and Asian countries)	
<b>D1.3</b>	<b>Participation of the workers in scientific community activities (organizing of conferences and workshops, invited lectures, awards)</b>
Active participation in conferences, a number of invited lectures, etc.	

#### Further criterion: 2. Vitality, sustainability and strategy (D2.1-D2.9)

<b>D2.1</b>	<b>Direction in line with the perspective of the planned research directions</b>
Good agreement between planned and realised research directions	
<b>D2.2</b>	<b>Assessment of the previous research objectives and their achievement</b>
Very important results in the field of medicine and high temperature technologies	
<b>D2.3</b>	<b>Assessment of implementation of recommendations from past evaluation</b>
The recommendations were successfully implemented.	
<b>D2.4</b>	<b>Success in receiving grants</b>
Many national grants, difficulties in obtaining international grants (small team), but active participation in international projects	
<b>D2.5</b>	<b>Adequacy of instrumental equipment</b>
Good level of instrumental equipment	
<b>D2.6</b>	<b>Effectiveness of management</b>
The management is effective and successful.	
<b>D2.7</b>	<b>Assessment of professional structure, development strategy and the strategy of keeping best scientists, age structure, career and qualification growth</b>
Relatively old staff, difficulties in attracting good young researchers	

<b>D2.8</b>	<b>Creating work-life balance conditions, assessment of approach towards possible gender issues</b>
Very small size of the team may create problems	
<b>D2.9</b>	<b>Relation of the team with regard to the integration, development and sustainability of the research centre funded by the National Programme of Sustainability II.</b>
N.A.	

### Further criterion: 3. Cooperation with universities and participation in education (D3.1-D3.6)

<b>D3.1</b>	<b>Scope of cooperation with universities on national and international level</b>
Good cooperation with Czech and foreign universities (Italy, Russia, Germany, the US, Switzerland, the Netherlands, etc)	
<b>D3.2</b>	<b>Effectiveness of joint research centres</b>
There are no joint centres, but there is active cooperation.	
<b>D3.3</b>	<b>Success rate in supervision of PhD students</b>
Small number of PhD students (1 PhD thesis defended)	
<b>D3.4</b>	<b>Participation of PhD students in the outputs</b>
Few PhD students, but relatively very strong PhD participation in the outputs	
<b>D3.5</b>	<b>Participation of the team in master or bachelor studies</b>
Good level of participation (7 BS and 3 MS theses defended)	
<b>D3.6</b>	<b>Assessment of cooperation intensity with universities in the form of teaching</b>
Relatively small degree of teaching (4 courses), understandable in view of the team size	

### Further criterion: 4. Outreach activities (D4.1-D4.3)

<b>D4.1</b>	<b>Sufficiency of media strategy and activities in the area of research popularisation</b>
The team is active in research popularization.	
<b>D4.2</b>	<b>Publishing activities and its quality</b>
Good publishing activity (43 papers in IF journals, 3 books, 2 chapters)	
<b>D4.3</b>	<b>Participation in professional organisations in the area of research and development</b>
Members of the team are very active in professional organizations.	

### Other comments of the commission:

The Commission suggests efforts to increase the number of young researchers.

### 3. Department of Geochemistry

#### Strengths:

Good analytic infrastructure and results, clear orientation to pertinent environmental problems. Very good methodologic development leading to patent award

#### Weaknesses:

Paucity of innovative approaches in applying methods and use of excellent analytical results

#### Opportunities:

High potential for cooperation with more process-oriented scientists in the realm of geochemistry and environmental sciences

#### Threats:

Isolation of “granite research” within the team

#### Main criterion: 1. Quality of results (H1.1-H1.5)

<b>H1.1</b>	<b>Quality of selected outputs of Phase I</b>
Good. Slightly below average among all teams, above average within the institute. Most frequent publications in Q3, some in Q1.	
<b>H1.2</b>	<b>Contribution of workers on the outputs reached</b>
Author teams are mostly local or on national level, small number of papers with international collaboration. First or corresponding authorship for about 50% of outputs.	
<b>H1.3</b>	<b>Quality of all outputs and results</b>
Improvable, mostly in Q3 and Q4.	
<b>H1.4</b>	<b>The most valuable discoveries and findings in the fields, their importance for the field</b>
No major discoveries. Notable outputs on characterization of coal deposits and sedimentary matter; suitability of ash, biochars, and sewage sludge as pollutant sorbents; use of plastic waste in coke production; studies of CO <sub>2</sub> capture; mercury and other pollutant analysis of river sediments; mineralogy and geochemistry of uranium ore deposits.	
<b>H1.5</b>	<b>Contribution of the participation of the authors in large collaborations</b>
N/A	

#### Main criterion: 2. Societal relevance (H2.1-H2.5)

<b>H2.1</b>	<b>Societal relevance of outputs and results pursuant to CAS and institute mission</b>
High to very high societal relevance. Applications for environmental protection (analysis of pollutants, recycling of waste); studies of uranium ore deposits.	

<b>H2.2</b>	<b>System functionality for knowledge transfer into practise, its usefulness for society. The impact of the team's activity on proper practice in society in the area of social sciences and humanities</b>
Very good focus on standards and methods. New processes for identification and transfer of knowledge are in preparation/organizational phase at institutional level.	
<b>H2.3</b>	<b>Relation to practice</b>
Patent award: <i>Process for regeneration and/or reactivation of activated carbon in multiple hearth furnace and a multiple heart furnace for carrying out the process</i>	
<b>H2.4</b>	<b>Participation in AV21 strategy</b>
Atlas of Dust Particles (Natural Hazards program, with Institute of Geology CAS)	
<b>H2.5</b>	<b>Cooperation with regions of the Czech Republic</b>
None reported	

#### Further criterion: 1. Position in international and national context (D1.1-D1.3)

<b>D1.1</b>	<b>Comparison of the team with similar international and national institutes</b>
Good national and international standing in analytics; international accreditation for coal petrography	
<b>D1.2</b>	<b>Scope and quality of international and national cooperation and the role of the team in such cooperation; engagement in broad international cooperation</b>
Quite good for organic petrology, very good focus on standards and methods. Cooperation with University of Salzburg (Moldanubian batholites; joint research project FMF-GAČR); International Committee Meeting for Coal and Organic Petrology; bilateral project with Egypt; RWTH Aachen (research fellowship). Analysis of adsorption in zeolites (Jaroslav Heyrovsky Institute of Physical Chemistry); adsorption analysis of oxides (Faculty of Mathematics and Physics, Charles University)	
<b>D1.3</b>	<b>Participation of the workers in scientific community activities (organizing of conferences and workshops, invited lectures, awards)</b>
2nd International Conference on the Future of Energy, Geology and Environment 2017 in Cairo (members of conference board). Potential for improvement, Geochemical baselines and standards are areas of potential cooperation.	

#### Further criterion: 2. Vitality, sustainability and strategy (D2.1-D2.9)

<b>D2.1</b>	<b>Direction in line with the perspective of the planned research directions</b>
The structure of the department is in line with the planned research.	
<b>D2.2</b>	<b>Assessment of the previous research objectives and their achievement</b>
The research progressed on a broad range of topics from coal and organic material studies through environmental, geochemical, and petrological analyses, studies of rock parameters, to CO <sub>2</sub> storage and capture. The topic of permineralized fossils has been	

abandoned, and a new topic of sorbent characterization has been developed. The results are adequate given the human and financial resources.	
<b>D2.3</b>	<b>Assessment of implementation of recommendations from past evaluation</b>
Implementation was partially successful: new student and post-doc, cooperation with RWTH Aachen, expanded outreach activities; progressive transition from geochemistry to environmental research and interdisciplinary studies; closer cooperation with other departments within the institute.	
<b>D2.4</b>	<b>Success in receiving grants</b>
Some success at the national level (GAČR, TAČR).	
<b>D2.5</b>	<b>Adequacy of instrumental equipment</b>
Good.	
<b>D2.6</b>	<b>Effectiveness of management</b>
Adequate.	
<b>D2.7</b>	<b>Assessment of professional structure, development strategy and the strategy of keeping best scientists, age structure, career and qualification growth</b>
New recruitment by tenders, continuous training of team members, bonus rewards according to performance. Large ratio of part-time employees. Potential for improvement.	
<b>D2.8</b>	<b>Creating work-life balance conditions, assessment of approach towards possible gender issues</b>
Gender unbalance towards the presence of women in the team.	
<b>D2.9</b>	<b>Relation of the team with regard to the integration, development and sustainability of the research centre funded by the National Programme of Sustainability II.</b>
N/A	

### Further criterion: 3. Cooperation with universities and participation in education (D3.1-D3.6)

<b>D3.1</b>	<b>Scope of cooperation with universities on national and international level</b>
Cooperation with Charles University (Faculty of Mathematics and Physics).	
<b>D3.2</b>	<b>Effectiveness of joint research centres</b>
Laboratory of Sorption and Porosimetric Analysis (joint with Charles Univ., Faculty of Science): assessment of authentic and replacement rocks for the reconstruction of Charles Bridge; specifications of materials for nuclear waste storage seals.	
<b>D3.3</b>	<b>Success rate in supervision of PhD students</b>
Good, 3 theses defended.	
<b>D3.4</b>	<b>Participation of PhD students in the outputs</b>
Doctoral students were first authors of at least two publications each.	



<b>D3.5</b>	<b>Participation of the team in master or bachelor studies</b>
1 Bc and 2 MSc theses defended.	
<b>D3.6</b>	<b>Assessment of cooperation intensity with universities in the form of teaching</b>
Adequate. Team members regularly lecture at several Czech Universities (Masaryk in Brno, Palacký in Olomouc, Charles University and Czech Technical University in Prague).	

#### Further criterion: 4. Outreach activities (D4.1-D4.3)

<b>D4.1</b>	<b>Sufficiency of media strategy and activities in the area of research popularisation</b>
Increased visibility, regular participation at <b>Science Fair</b> event, exhibition of fossils in museum in Soběslav, exhibition within the <b>Week of Science and Technology CAS</b> . Public lectures on fossils and coal self-ignition.	
<b>D4.2</b>	<b>Publishing activities and its quality</b>
Two papers in <b>Vesmír</b> , and several other contributions to semi-professional journals.	
<b>D4.3</b>	<b>Participation in professional organisations in the area of research and development</b>
Adequate: Membership in national and international organizations and boards (Academy Assembly, Czech Chemical Society, Czech Geological Society, European Geochemical Society, TSOP)	

**Other comments of the commission:**

## 4. Department of Seismotectonics

### Strengths:

Important research on, and mapping of crustal fault systems that probably contribute to earthquake activity. Emphasis on seismically active Western Bohemia. The Department has developed and improved on seismic detection and recording instruments. This includes study of human modifications of the ground surface.

### Weaknesses:

Student recruitment is key. Outreach promotion of the department's significance in society is weak. This is unfortunate, since the department is developing information on seismic risks and natural disasters. Lacks of middle-aged or older than 50 researchers who can provide experience and leadership.

### Opportunities:

Expansion of media coverage; working with international colleagues (is improving).

### Threats:

Lack of critical mass of young staff to maintain the research group. Potential overlapping with other groups with similar research objectives.

### Main criterion: 1. Quality of results (H1.1-H1.5)

<b>H1.1</b>	<b>Quality of selected outputs of Phase I</b>
Of 54 listed IF (Impact factor journal publications), none is in a high IF (>5), 24 in low IF (<2), 1 in a Czech (i.e. regional) journal, with 28 in an acceptable IF (2-4). Given 9 researchers, this averages 5 per researcher over the 5-year period, with an average of one per year. In general, it can be considered as good with potential for very good.	
<b>H1.2</b>	<b>Contribution of workers on the outputs reached</b>
Scope of topics ranges from seismic risks, slope stability, water injections affecting fault attenuations, and evidence of paleoseismic events all largely in Bohemia with some in Iceland, Italy, and eastern Carpathians. Some papers are presented with only authors from the group. In general, there are many publications whose first author is a researcher from the group.	
<b>H1.3</b>	<b>Quality of all outputs and results</b>
Work is generally of good quality. This has been a significant improvement over productivity we witnessed at first evaluation.	
<b>H1.4</b>	<b>The most valuable discoveries and findings in the fields, their importance for the field</b>
In an applied sense, seismic risk, studying faults, hydrological systems affecting them, as well as frailty of slopes adjacent or close to these fractures is important in establishing areas with potential for landslide disasters. Therefore, mapping faults is extremely consequential and results contribute to the global understanding of seismic risks and their underlying causes. The development of a new type of seismic sensor is of great importance to the seismological community.	
<b>H1.5</b>	<b>Contribution of the participation of the authors in large collaborations</b>

The one relatively high IF publication (IF = 5.64) Borovička is lead author, with 9 co-authors, citing video records of the Chelyabinsk superbolide – a very current topic. Another multi-author paper, with L. Nováková addresses stability of underground storage systems – a topic concerning suitable disposal sites for radioactive waste and possibility toxic materials.

## Main criterion: 2. Societal relevance (H2.1-H2.5)

<b>H2.1</b>	<b>Societal relevance of outputs and results pursuant to CAS and institute mission</b>
As mentioned in H1.5, the Seismotectonics group produces studies with high impact on the country's seismic risks, with contributions assessing hydraulic effects on faults, and suitable underground storage for future use. The group's studies have also impacted countries outside of Czech Republic. The working relationship with Iceland and the development of a new eruptive process in the region may allow a new avenue of social and media impact for the group.	
<b>H2.2</b>	<b>System functionality for knowledge transfer into practise, its usefulness for society. The impact of the team's activity on proper practice in society in the area of social sciences and humanities</b>
Probably the highest impacts of the department members apply to seismic risk (and damage to buildings (with masonry construction) in current and future population areas. his has a huge effect on residents' sense of security.	
<b>H2.3</b>	<b>Relation to practice</b>
Direct relationship between pure and applied research. High marks for this.	
<b>H2.4</b>	<b>Participation in AV21 strategy</b>
Participation in Program <i>Systems for the Nuclear Power Industry</i> . Ground stability (earthquakes and landslides) related to fault movements is a key element in any country's future. The department is addressing this quite well. Given that nuclear energy may be pursued, safe and seismically stable disposal sites will be mandatory. The department's contributions are directly relevant.	
<b>H2.5</b>	<b>Cooperation with regions of the Czech Republic</b>
Cooperation with municipalities on prevention of landslides (Cheb, Karlovy Vary, Chomutov, Děčín). Participation in RINGEN geothermal energy project. Cooperation with national parks (glacial cirques and block-field stability).	

## Further criterion: 1. Position in international and national context (D1.1-D1.3)

<b>D1.1</b>	<b>Comparison of the team with similar international and national institutes</b>
The seismotectonics group compares favourably with parallel groups outside the country. Most countries are addressing the same issues and consequences of inadequate study are well known.	

<b>D1.2</b>	<b>Scope and quality of international and national cooperation and the role of the team in such cooperation; engagement in broad international cooperation</b>
Expanding cooperation with Italy, Ethiopia and Iceland. This represents progress for the department. It is mentioned other cooperation with: Slovakia; USA; China; Switzerland; and Saudi Arabia.	
<b>D1.3</b>	<b>Participation of the workers in scientific community activities (organizing of conferences and workshops, invited lectures, awards)</b>
Active participation organizing conferences with presence in several conferences, invited lectures and earned awards.	

## Further criterion: 2. Vitality, sustainability and strategy (D2.1-D2.9)

<b>D2.1</b>	<b>Direction in line with the perspective of the planned research directions</b>
Steady growth of outputs is apparent. With renovated building, laboratories and better-defined research expectations, the department should provide more significant applied results in its future.	
<b>D2.2</b>	<b>Assessment of the previous research objectives and their achievement</b>
Applied work has been valuable for land use planning.	
<b>D2.3</b>	<b>Assessment of implementation of recommendations from past evaluation</b>
Steady growth of outputs is apparent. With renovated building, laboratories and better-defined research expectations, the department should provide more significant applied results in its future.	
<b>D2.4</b>	<b>Success in receiving grants</b>
Mostly Academy of Sciences and national Grant Agency support. We recommend pursuit of EC and other external support.	
<b>D2.5</b>	<b>Adequacy of instrumental equipment</b>
New seismograph (team's design and construction, a rotational seismograph, recording surface waves, paleo-stress, and location for geothermal resources. 6 component seismic sensor rotaphone. Shared use of a portable broadband seismic network. Management of the MKnet seismic network	
<b>D2.6</b>	<b>Effectiveness of management</b>
Unclear. Younger managers are noted, thereby promoting research activity expansion.	
<b>D2.7</b>	<b>Assessment of professional structure, development strategy and the strategy of keeping best scientists, age structure, career and qualification growth</b>
During our meeting with the department, it was noted that two younger scientists had accepted temporary(?) positions abroad, and there was concern whether they would return to the department. Issues relating to this are salaries, and a perceived inertia problem with some colleagues.	

<b>D2.8</b>	<b>Creating work-life balance conditions, assessment of approach towards possible gender issues</b>
	As with many institutes in ČAV, especially shown in the first evaluation, under-represented among researchers are women. This has improved, and managers are aware of the problem.
<b>D2.9</b>	<b>Relation of the team with regard to the integration, development and sustainability of the research centre funded by the National Programme of Sustainability II.</b>
	Not applicable

### Further criterion: 3. Cooperation with universities and participation in education (D3.1-D3.6)

<b>D3.1</b>	<b>Scope of cooperation with universities on national and international level</b>
	Arba Minch University, Ethiopia, Iceland; University of Trieste, Italy; University of Camerino, Italy; Technological University, Freiburg, Germany; King Saud University, Saudi Arabia; Eidgenössische Technische Hochschule (ETH), Zürich; University of Memphis, USA.
<b>D3.2</b>	<b>Effectiveness of joint research centres</b>
	N/A
<b>D3.3</b>	<b>Success rate in supervision of PhD students</b>
	Very difficult to recruit PhD students. Recruitment abroad is initiating. It is mentioned 3 PhD students were supervised in the evaluation period.
<b>D3.4</b>	<b>Participation of PhD students in the outputs</b>
	There are presented four papers in where the PhD students are involved.
<b>D3.5</b>	<b>Participation of the team in master or bachelor studies</b>
	Charles University: two bachelor courses (Introduction to Applied Geophysics and Geoelectrics and Well Logging. University of Camerino (Italy) one course (Applied Seismology). Participation in a Master course (Field Course from Applied Geophysics) at Charles University.
<b>D3.6</b>	<b>Assessment of cooperation intensity with universities in the form of teaching</b>
	Adequate. J. Valenta teaches 3 courses at Charles University; G. Dal Moro one course at the University of Camerino (Italy).

### Further criterion: 4. Outreach activities (D4.1-D4.3)

<b>D4.1</b>	<b>Sufficiency of media strategy and activities in the area of research popularisation</b>
	We recommend more outreach (electronic and printed media) to emphasize the department's significant impacts on seismic risks countrywide. There are excellent examples of slope failures to promote.

<b>D4.2</b>	<b>Publishing activities and its quality</b>
Reasonable website, but the general public may not know of its existence.	
<b>D4.3</b>	<b>Participation in professional organisations in the area of research and development</b>
Needs improvement. Admittedly, during COVID pandemic, such activities were curtailed, but pre-pandemic information is scant.	

**Other comments of the commission:**

## 5. Department of Engineering Geology

### Strengths:

The department analyses and interprets geodynamic and rock weathering phenomena affecting stability of rocks and slopes. It concerns phenomena linked both with subaerial effects (such as slope deformation, weathering) and with subterranean processes (e.g. fault movements). A special attention is given to the development of reliable and precise monitoring methods for slope and tectonic processes and to forecasting their occurrence and development in space and time.

### Weaknesses:

Student recruitment is key. Outreach promotion of the department's significance in society is weak. This is unfortunate, since the department is developing information on seismic risks that could yield a natural disaster of consequence.

### Opportunities:

Expansion of media coverage; working with international colleagues (is improving).

### Threats:

Group too small to guarantee its consolidation in the event of a withdrawal. No representation of researchers over 45 (except 1) with lack of experience and international leadership.

### Main criterion: 1. Quality of results (H1.1-H1.5)

<b>H1.1</b>	<b>Quality of selected outputs of Phase I</b>
Of 59 listed IF (Impact factor journal publications), four are in a high IF (>5), 5 in low IF (<2), 1 in a Czech (i.e. regional) journal, with 41 in an acceptable IF (2-4). Given 10 researchers, this averages 5 per researcher over the 5-year period, with an average of one per year. Four high IF publications are above average for institutes reviewed in this evaluation period. It is rated in comparison with similar groups as good / very good.	
<b>H1.2</b>	<b>Contribution of workers on the outputs reached</b>
Research on geodynamics (overlap with other departments and institutes), slope stability related to faults, and estimations of timings of slope failures. This includes studies of rock weathering rates related to rainfall. Most of the papers evaluated have a very broad composition of researchers in the group as first authors or corresponding authors.	
<b>H1.3</b>	<b>Quality of all outputs and results</b>
Work is of quite good quality, with the number of good IF journal publications as testament.	
<b>H1.4</b>	<b>The most valuable discoveries and findings in the fields, their importance for the field</b>
Good work in applied engineering, seismic risk, fault study, hydrological and ice weathering systems affecting ground instability are important in establishing areas with potential for landslide disasters. Therefore, mapping areas of previous slope failures and faults is extremely consequential and results contribute to the global understanding of seismic risks and their underlying causes. Monitoring of geodynamic movements is the highest scientific value in this group.	
<b>H1.5</b>	<b>Contribution of the participation of the authors in large collaborations</b>

While not the first author, Blahůt appears to be a significant part of a landslides on volcanic islands group. Schweigstillová has contributed to a significant study of phyllosilicates (micas) and their part in crumbling sandstones. Briestenský, lead author on a local journal, presents analyses of stress and strain related to cave formation in Slovakia. Klimeš is part of a study (IF = 9.0) using LiDAR and resistivity work, related to deep-seated origins of slope failures. He is also part of a group, publishing, in a high IF journal, that presents SAR satellite imagery to assess landslides in Perú. The collaboration of the landslide hazard study for the island of El Hierro (Canary Islands) is presented as a great achievement.

## Main criterion: 2. Societal relevance (H2.1-H2.5)

<b>H2.1</b>	<b>Societal relevance of outputs and results pursuant to CAS and institute mission</b>
As mentioned in H1.5, the Engineering Geology group produces studies with high impact on the country's risks of slope failures as a result of rock weathering, water saturation of slopes and faults. The group's studies have also impacted countries outside of Czech Republic.	
<b>H2.2</b>	<b>System functionality for knowledge transfer into practise, its usefulness for society. The impact of the team's activity on proper practice in society in the area of social sciences and humanities</b>
Various studies by the department address rock weathering, soil saturation and gravity influences on slope failures = landslides.	
<b>H2.3</b>	<b>Relation to practice</b>
Direct relationship between pure and applied research. High marks for this.	
<b>H2.4</b>	<b>Participation in AV21 strategy</b>
Participation in programs <i>Natural Hazards</i> and <i>The City as a Laboratory of Change</i> . Slope stability (landslides) related to rock weathering and water saturation of soils is a key element in any country's future. The department is addressing this quite well. Landslides can burst dams, cause floods and wreak havoc for society. The department's contributions are directly relevant.	
<b>H2.5</b>	<b>Cooperation with regions of the Czech Republic</b>
A recurring theme that brought the evaluators' attention is the insularity of many institutes and their departments.. It is mentioned in their report a large list of Czech Republic institutions which they cooperate, such as: Geophysical Institute, Geological Institute, Archaeological Institute, Institute of State and Law of the Czech Academy of Sciences; different Departments of Charles University, Ostrava University and University of J.E.Purkyně; Czech Geological Survey and Bohemian Switzerland National Park.	

## Further criterion: 1. Position in international and national context (D1.1-D1.3)

<b>D1.1</b>	<b>Comparison of the team with similar international and national institutes</b>
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The engineering geology group compares favourably with parallel groups outside the country. Most countries are addressing the same issues and consequences of inadequate study are well known.	
<b>D1.2</b>	<b>Scope and quality of international and national cooperation and the role of the team in such cooperation; engagement in broad international cooperation</b>
Expanding cooperation with Italy, Austria, Spain, Belgium, Bulgaria, Germany, Poland Slovenia, Slovakia, Switzerland and UK in Europa, and outside with Ethiopia, Kyrgyzstan, Peru, New Zealand and USA.	
<b>D1.3</b>	<b>Participation of the workers in scientific community activities (organizing of conferences and workshops, invited lectures, awards)</b>
The members of the team of the Dpt. of Engineering Geology organized or participated on organization of several conferences, workshops and seminars. Mostly of them with international character. At least 5 invited lectures and three awards are reported.	

## Further criterion: 2. Vitality, sustainability and strategy (D2.1-D2.9)

<b>D2.1</b>	<b>Direction in line with the perspective of the planned research directions</b>
Steady growth of outputs is apparent. With renovated building, laboratories and better-defined research expectations, the department should provide more significant applied results in its future. Publications in significant IF journals are very positive, and the team deserves congratulations.	
<b>D2.2</b>	<b>Assessment of the previous research objectives and their achievement</b>
Applied and pure science was average previously, and improvement is duly noted since the first evaluation.	
<b>D2.3</b>	<b>Assessment of implementation of recommendations from past evaluation</b>
The department has been keen to improve its impacts in pure and applied science. Improvement is noted, yet we hope this will expand.	
<b>D2.4</b>	<b>Success in receiving grants</b>
Mostly Academy of Sciences, national Grant Agency, and intra-country support. We recommend pursuit of EC and other external support.	
<b>D2.5</b>	<b>Adequacy of instrumental equipment</b>
The department appears to possess the equipment required to complete its engineering tasks. Also noted in cave stability monitoring are extensometric gauges, monitoring the selected faults, and radon monitoring.	
<b>D2.6</b>	<b>Effectiveness of management</b>
Unclear. We recommend that managers listen to researcher needs, participate in projects in their field, and promote synergism. A team approach is always preferable.	
<b>D2.7</b>	<b>Assessment of professional structure, development strategy and the strategy of keeping best scientists, age structure, career and qualification growth</b>

During our meeting with the department, there was concern whether the younger scientists would move to higher paying positions, either outside of the country, or to the private sector. This is a global concern, and working in an institute has advantages not available in other venues.	
<b>D2.8</b>	<b>Creating work-life balance conditions, assessment of approach towards possible gender issues</b>
As with many institutes in ČAV, especially shown in the first evaluation, under-represented among researchers are women. This has improved, and managers are aware of the problem.	
<b>D2.9</b>	<b>Relation of the team with regard to the integration, development and sustainability of the research centre funded by the National Programme of Sustainability II.</b>
Group appears to be functional.	

### Further criterion: 3. Cooperation with universities and participation in education (D3.1-D3.6)

<b>D3.1</b>	<b>Scope of cooperation with universities on national and international level</b>
University of J.E.Purkyně, Ústí, Ostrava University, Charles University, University of Vienna, Austria, Université de Mons Research (Belgium), Liege University (Belgium), German University in Tübingen, University of Campania (Italy), Universidad de Oviedo (Spain), University of Zurich (Switzerland), Coventry University (UK), Massey University (New Zealand), San Diego State University (USA). It is important to mention the involvement in the EPOS platform at EU level.	
<b>D3.2</b>	<b>Effectiveness of joint research centres</b>
World Centre of Excellence on Landslide Disaster Reduction (with Charles Univ., Faculty of Science). Notable compilation of landslide databases.	
<b>D3.3</b>	<b>Success rate in supervision of PhD students</b>
Very difficult to recruit PhD students.	
<b>D3.4</b>	<b>Participation of PhD students in the outputs</b>
One PhD student in department. Two PhD students recently graduated. There is a qualitative description of their activities throughout this period.	
<b>D3.5</b>	<b>Participation of the team in master or bachelor studies</b>
The department is largely involved in: 4 bachelor courses at Charles University; 6 master courses at Charles University; 1 master course at Ostrava University and 1 master course at Masaryk University, Brno.	
<b>D3.6</b>	<b>Assessment of cooperation intensity with universities in the form of teaching</b>
The department is leading institution and collaborating in research project with other universities. In addition the department is actively involved in joint works focused on: compiling landslide-related databases; landslide monitoring and hazard assessment and searching new ways of transferring the research results to the public This involvement is very high compared to other groups evaluated and given the composition of the group.	

#### Further criterion: 4. Outreach activities (D4.1-D4.3)

<b>D4.1</b>	<b>Sufficiency of media strategy and activities in the area of research popularisation</b>
There are several actions presented as: Films, lectures for general public, articles in printed journals, online brochures, books, TV, radio, press interviews. We recommend more outreach (electronic and printed media) to emphasize the department's significant impacts on seismic risks countrywide. There are excellent examples of slope failures to promote. Further there are many caves in Czech Republic, and these could be promoted as tourist destinations.	
<b>D4.2</b>	<b>Publishing activities and its quality</b>
Reasonable website, but the general public may not know of its existence. Suggest more promotion of department's value to society.	
<b>D4.3</b>	<b>Participation in professional organisations in the area of research and development</b>
Recommend more participation in presentations to the public. Professional talks and participation appear adequate, considering budget.	

**Other comments of the commission:**

## 6. Department of Neotectonics and Thermochronology

### Strengths:

Good age structure; new research directions, two new laboratories established; reconstruction and modernization of all laboratories, new research equipment; increase in publication activity and quality; broadened international collaborations and visibility; ca. 20% researchers from abroad; monitoring within global and European networks; involved in large research infrastructure programs; strong engagement in student education;

### Weaknesses:

Team very small; low salaries for early-career scientists; external funding necessary for significant research

### Opportunities:

With establishment of U-Th/He thermochronology laboratory, the team's productivity and value to other research groups modeling landscape stability increases significantly.

### Threats:

Department could be crippled if any individual leaves, this may cause or caused already severe problems for small teams; insufficient funding for national infrastructure projects

### Main criterion: 1. Quality of results (H1.1-H1.5)

<b>H1.1</b>	<b>Quality of selected outputs of Phase I</b>
Of 24 listed IF (Impact factor journal publications), none is in a high IF (>5), 6 in low IF (<2), 1 in a Czech (i.e. regional) journal, with 17 in an acceptable IF (2-4). Given 6 researchers, this averages 4 per researcher over the 5-year period, with an average of 0.8 per year. In general, it can be considered as less than average.	
<b>H1.2</b>	<b>Contribution of workers on the outputs reached</b>
A good publication records with several papers with first author from the Team member. 2 papers have multiple department members, and contributions are on seismic problems in Kashmir, SE Iberian Peninsula (Spain), Apennines (Italy), southern California (USA), and central México. These studies, combined with team's work in Bohemia and western Carpathian Mountains, provide predictions for future seismic events in Czech Republic.	
<b>H1.3</b>	<b>Quality of all outputs and results</b>
Work is generally of good quality. This has been an improvement over productivity we witnessed in the first evaluation. One team member has been awarded a US Fulbright fellowship for work AT CalTech, USA.	
<b>H1.4</b>	<b>The most valuable discoveries and findings in the fields, their importance for the field</b>
The team employs tectonic geomorphology, structural geology, applied geophysics, paleoseismology, dating, and mineralogical study of fault rocks that contribute to seismic hazard assessment, which is used for evaluation of large civil engineering structures such as nuclear power plants, disposal of radioactive waste. The focus on paleoseismicity is key to such applied projects. Addition of a U-Th/He thermochronology laboratory in 2015-2016 (with 2 years required for calibrations) has provided data on timings of exhumation (weathering) and tectonics in several areas. This is valuable in recording earthquake history.	

<b>H1.5</b>	<b>Contribution of the participation of the authors in large collaborations</b>
See H1.2	

## **Main criterion: 2. Societal relevance (H2.1-H2.5)**

<b>H2.1</b>	<b>Societal relevance of outputs and results pursuant to CAS and institute mission</b>
As mentioned in H1.2, the Neotectonics and Thermochronology group produces studies of historic seismic (earthquake) events. This is a valuable tool for research on such activity in westernmost Bohemia. The group's studies have also impacted countries outside of Czech Republic. Thermochronology unravels long term morphotectonic landscape development and contributes to understanding landscapes and regions.	
<b>H2.2</b>	<b>System functionality for knowledge transfer into practise, its usefulness for society. The impact of the team's activity on proper practice in society in the area of social sciences and humanities</b>
Probably the highest impacts of the department members apply to probability and likely timings of seismic events and damage to buildings (with masonry construction) in current and future population areas. This has a high value for residents' sense of security.	
<b>H2.3</b>	<b>Relation to practice</b>
Monitoring of slope and tectonic processes; seismic hazard of nuclear installations. Direct relationship between pure and applied research. Very nice work for the small team.	
<b>H2.4</b>	<b>Participation in AV21 strategy</b>
Earthquakes and landslides and their histories are key elements in any country's future. The department is addressing these quite well. Given that nuclear energy may be pursued, safe and seismically stable disposal sites will be mandatory. The new thermochronology laboratory adds critical information on past catastrophic (seismic or earthquake) events. The department's contributions are directly relevant.	
<b>H2.5</b>	<b>Cooperation with regions of the Czech Republic</b>
The evaluators feel that intra-country cooperation can be further improved.	

## **Further criterion: 1. Position in international and national context (D1.1-D1.3)**

<b>D1.1</b>	<b>Comparison of the team with similar international and national institutes</b>
The neotectonics and thermochronology group compares favorably with parallel groups outside the country. Most countries are addressing the same issues and consequences of inadequate study are well known. The Czech group is not only performing very up-to-date research methods, but its addition of the thermochronology laboratory is very advantageous for front-line research.	

<b>D1.2</b>	<b>Scope and quality of international and national cooperation and the role of the team in such cooperation; engagement in broad international cooperation</b>
Expanding cooperation with USA, India, Mexico, Poland, Slovakia, Spain, Austria, Bulgaria, Ethiopia, Germany and Turkey.	
<b>D1.3</b>	<b>Participation of the workers in scientific community activities (organizing of conferences and workshops, invited lectures, awards)</b>
The small team has organized 11 conferences, some with oral presentations and field excursions, and has a good profile at conferences. They are to be commended.	

## Further criterion: 2. Vitality, sustainability and strategy (D2.1-D2.9)

<b>D2.1</b>	<b>Direction in line with the perspective of the planned research directions</b>
Steady growth of outputs is apparent. With renovated building and the new thermochronology laboratory the department should provide more and significant applied (and pure) results in its future.	
<b>D2.2</b>	<b>Assessment of the previous research objectives and their achievement</b>
The department was very conscientious to understand and improve its performance, following the first evaluation. Considering the team's size, it is doing as well as can be expected.	
<b>D2.3</b>	<b>Assessment of implementation of recommendations from past evaluation</b>
The department has maintained its research productivity. With addition of the new thermochronology laboratory, increased productivity appears likely. Organizing conferences (from first evaluation) was implemented.	
<b>D2.4</b>	<b>Success in receiving grants</b>
No information.	
<b>D2.5</b>	<b>Adequacy of instrumental equipment</b>
The new U-Th/He thermochronology laboratory is a valuable addition to enhance the team's research.	
<b>D2.6</b>	<b>Effectiveness of management</b>
Unclear. Younger managers are noted, thereby promoting research activity expansion.	
<b>D2.7</b>	<b>Assessment of professional structure, development strategy and the strategy of keeping best scientists, age structure, career and qualification growth</b>
The six-member research team (exclusive of technicians and students) functions as best it can. With cooperation of foreign scientists, the group has managed reasonable research productivity. Age structure is promising for the future.	
<b>D2.8</b>	<b>Creating work-life balance conditions, assessment of approach towards possible gender issues</b>
As with many institutes in ČAV, especially shown in the first evaluation, under-represented among researchers are women. This has improved, and managers are aware of the problem.	

<b>D2.9</b>	<b>Relation of the team with regard to the integration, development and sustainability of the research centre funded by the National Programme of Sustainability II.</b>
The group is very functional and shows good synergy (witnessed by participation in multi-authored publications).	

### Further criterion: 3. Cooperation with universities and participation in education (D3.1-D3.6)

<b>D3.1</b>	<b>Scope of cooperation with universities on national and international level</b>
Charles University, Masaryk University, Comenius University, University of South Bohemia, Arba Minch University Ethiopia, San Diego State University, USA. Lectures at University of Göttingen (Germany), University of Kolkata (India). We suggest expanded collaboration with international universities.	
<b>D3.2</b>	<b>Effectiveness of joint research centres</b>
None given	
<b>D3.3</b>	<b>Success rate in supervision of PhD students</b>
Dr. Štěpančíková, team leader co-supervised 1 and supervised 3 PhD theses. And the team is working with 4 PhD students, 2 of whom will finish soon.	
<b>D3.4</b>	<b>Participation of PhD students in the outputs</b>
These students are essential in productivity by a small team. Excellent synergy.	
<b>D3.5</b>	<b>Participation of the team in master or bachelor studies</b>
16 bachelor students, in various Czech universities (principally Charles University). 15 MS students.	
<b>D3.6</b>	<b>Assessment of cooperation intensity with universities in the form of teaching</b>
Considerable participation, primarily in Prague.	

### Further criterion: 4. Outreach activities (D4.1-D4.3)

<b>D4.1</b>	<b>Sufficiency of media strategy and activities in the area of research popularisation</b>
Very high and imaginative.	
<b>D4.2</b>	<b>Publishing activities and its quality</b>
Significant outputs in popular (layman) publications, inclusion in many live television programs	
<b>D4.3</b>	<b>Participation in professional organisations in the area of research and development</b>
The small team is ready to perform these actions, for example it is possible to mention: the team members are members of EGU, AGU, SSA, IAEG, SCEC (Southern California Earthquake Center), INQUA (International Quaternary Association), Central European	

Tectonic Group (CETEG), Society of Exploration Geophysicists (SEG), European Association of Geoscientists and Engineers (EAGE) - Local Chapter Prague, and of national associations such as Czech Association of Geomorphologists (ČAG), Czech Association of Geophysicists (ČAAG), etc. Moreover, Dr. Štěpančíková was a vice-chairman of ČAG (2009-2016), Dr. Štěpančíková was co-leader of International Focus Group within INQUA entitled Earthquake Geology and Seismic Hazard (EGSHAZ) (2015-2019), and now she is a vice president of TERPRO commission within INQUA (2019-2023). Dr. Tábořík is a vice-chairman of ČAG 2017-2024), prof. T. Rockwell is a member of the Board of Directors for the Southern California Earthquake Center (SCEC).

**Other comments of the commission:**

Group needs more research personnel to develop its capabilities, especially with addition of its unique thermochronology laboratory that will assist landform stability studies by the group and other institutes.

It is astonishing that Fission Track Dating (FT) is not hosted in the IRSM and in this department. It should be considered to merge U-Th/He and FT dating in one department to increase synergy.



**Final report was elaborated by:**

**Commission 7.1 - Engineering and technology**

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**Commission 4 - Earth and environmental sciences**

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