

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

Final Report

Name of the Institute: Institute of Geophysics of the CAS, v. v. i.

Evaluated teams and their leaders:

1. Seismology Team (Jan Šílený)
2. Geodynamic Processes Team (David Uličný)
3. Geomagnetism Team (Eduard Petrovský)

Part A: Evaluation of the institute

Strengths:

Good background experience and tradition, adequate equipment, broad national and international cooperation.

Weaknesses:

Unbalanced age structure, low number of students. Thematic overlap within the Institute and across the CAS, duplicities. Limited cooperation between the teams in the Institute.

Opportunities:

Continuation with recruitments of new researchers also from abroad. Increased exchange of young scientists (postdocs) with cooperating international institutions, ideally bidirectional. European and international funding.

Threats:

Some of the newly established teams are too small to reach a *critical mass* and at the risk of dissolution if the leading scientist leaves the institute. Some individuals' expertise has clear overlap with members of other institutes.

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

H1.1	Quality of selected outputs of Phase I
Good. About average in inter-institutional comparison with some high-quality publications in Q1.	
H1.2	Contribution of workers on the outputs reached
Favourable ratio of first-authorship. Good balance between small single-institution teams, and results of broader national and international cooperation.	
H1.3	Quality of all outputs and results
Good, Q2 journals most frequent.	
H1.4	The most valuable discoveries and findings in the fields, their importance for the field
Solid progress in many geophysical disciplines. Highlights: Bohemian Massif; Rock slope instabilities; Planetary surface processes; Crystal mush flow; AMS fabric in marble; Characterisation of andosols; Mushy flow modelling; Electrical conductivity of Carpathians. See more details for individual teams.	
H1.5	Contribution of the participation of the authors in large collaborations
N/A	

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

H2.1	Societal relevance of outputs and results pursuant to CAS and institute mission
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While part of the institute mission is dedicated to basic research, some of the outputs have high societal relevance: Operation of the seismological service. Seismicity of Western Bohemia. Applications in exploration industry, Space weather, forecasting of magnetic storms, and Archeomagnetism.	
H2.2	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
The applications usually take the form of joint projects or contracts with industry, government and non-government organizations. These are organized on an ad-hoc basis, depending on the topic and interest of the parties involved. Under present circumstances, this approach works satisfactorily and there is no need for a more systematic scheme of knowledge transfer.	
H2.3	Relation to practice
Most practical applications are in the area of seismology (slope monitoring, exploration), followed by applications of environmental geomagnetism.	
H2.4	Participation in AV21 strategy
Highly commendable. Numerous activities in the <i>Natural Hazards</i> and <i>Climate change</i> programmes.	
H2.5	Cooperation with regions of the Czech Republic
Focused and effective. Two successful projects were completed, related respectively to re-excavation of a volcano, and supporting geophysical studies for the mining region of Erzgebirge successful application to the UNESCO World Heritage list.	

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

D1.1	Comparison of the teams and the institute with similar international and national institutes
The teams have high international standing at the forefront of their respective specializations.	
D1.2	Scope and quality of international and national cooperation and the role of the institute in such cooperation; engagement in broad international cooperation
Broad cooperation on the national and international level with universities and other research institutes. Multiple joint projects in different areas, joint publications, often lead by PIs from the institute.	
D1.3	Participation of the workers in scientific community activities (organizing of conferences and workshops, invited lectures, awards)
Varies among teams, but summarily on adequate level. Several prizes (Lumina quaerorum, Otto Wichterle) and invited lectures, notably also for young researchers. Organization of one major conference (IUGG General Assembly 2015) and numerous small to medium scientific events.	

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

D2.1	Direction in line with the perspective of the planned research directions
The institute undergoes major restructuring from method-oriented departments to a larger number of small teams dedicated to individual projects. While the research directions are appropriately set-up now, there is some risk involved with possible departure of leading researchers, and overlap of topics within the institute and outside. On the other hand, the new structure provides increased flexibility to address new opportunities effectively.	
D2.2	Assessment of the previous research objectives and their achievement
The research objectives were met in all departments in general. There has been a steady increase of high-quality publications and international cooperation.	
D2.3	Assessment of implementation of recommendations from past evaluation
The institute successfully addressed the problem of age gap and retirement of senior leading scientists. Several prospective young and mid-career researchers were hired and now lead their respective teams in the new structure. Regular evaluations of performance take place. Young researchers are motivated to gain experience abroad. The institute attempts to attract larger number of students, however, given the dwindling number of suitable candidates at Czech universities, this issue is not completely resolved. Outreach activities, and general visibility of the institute and its research have significantly increased.	
D2.4	Success in receiving grants
The institute is adequately successful in grant competitions at the national level. The newly created teams are encouraged to apply for European and international projects, which could provide substantial support in the future.	
D2.5	Adequacy of instrumental equipment
The institute is adequately equipped with significant renovations/replacements in the past (Czech GEO instruments, new GPS, analogue modelling lab).	
D2.6	Effectiveness of management
Effective, within the financial limits. Newly established International Advisory Board.	
D2.7	Assessment of professional structure, development strategy and the strategy of keeping best scientists, age structure, career and qualification growth
Focus on the transition towards the new scheme and recruitment of new staff. Regular evaluations of researchers, motivation for career growth.	
D2.8	Creating work-life balance conditions, assessment of approach towards possible gender issues
Steady improvements, additional flexibility related to maternity (part-time contracts, provisional kindergarten to be made permanent), support for young families, social, cultural, and sport events for employees.	
D2.9	Relation of the institute with regard to the integration, development and sustainability of the research centre funded by the National Programme of Sustainability II.
N/A	

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

D3.1	Scope of cooperation with universities on national and international level
Broad cooperation with universities in the Czech Republic (Charles University, Czech Technical University, Masaryk University in Brno) and abroad (Switzerland, US, UK, Germany, Portugal).	
D3.2	Effectiveness of joint research centres
Successful transfer of knowledge in RINGEN research centre (geothermal energy). Long-term cooperation with the Charles University in the SW3D Consortium.	
D3.3	Success rate in supervision of PhD students
6 PhD theses defended. Adequate number, with respect to low general numbers of Earth science students.	
D3.4	Participation of PhD students in the outputs
Adequate. Participation in grant projects, first authorship of papers.	
D3.5	Participation of the institute in master or bachelor studies
5 BSc and 2 MSc theses defended. Adequate, under the circumstances.	
D3.6	Assessment of cooperation intensity with universities in the form of teaching
Good cooperation with the Charles University, Faculty of Science, and other universities.	

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

D4.1	Sufficiency of media strategy and activities in the area of research popularisation
Significant increase in number of quality of outputs. Frequent appearance in relevant TV and radio broadcasts, two museums opened or renovated, Geopark at the institute premises, several exhibitions.	
D4.2	Publishing activities and its quality
Several contributions to Vesmír (popular scientific magazine in Czech), IAGA anniversary booklet, booklet on geological processes, and other. Quarterly published journal <i>Studia Geophysica et Geodaetica</i> (IF 1.247 as of 2019).	
D4.3	Participation in professional organisations in the area of research and development
At the highest level (E. Petrovský president of IAGA). Other researchers participate in various working groups and committees.	

Other comments of the commission:

Seismic monitoring and national earthquake service shall remain part of the Geophysical Institute and will be kept as efficient as it runs now. However, it should be considered as a separated unit with special national service tasks. Therefore, it should be fully financed separately from and additional to the institute.

Part B: Evaluation of teams

1. Seismology Team

Strengths: Traditional research field with broad scope of interest, expertise in mathematics and physics, large network of international collaboration, solid instrument base, successful in grant competition at national level.

Weaknesses: Limited cooperation within the heterogeneous group. Age gap between experienced senior scientists at or near retirement age, and the new generation. In the holistic approach of research on “lithospheric processes” and “seismic event mechanisms,” the material sciences (petrology, thermodynamic modelling, etc.) are not visible in the concept. Lack of cooperation with other teams in the institute.

Opportunities: Applications for funding at European level. A new cohort of young high-quality researchers.

Threats: Loss of focus to attain and maintain excellent outputs.

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

H1.1	Quality of selected outputs of Phase I
Good (above average in inter-team comparison).	
H1.2	Contribution of workers on the outputs reached
Adequate. The authors' participation spans the entire spectrum from single-institution publications, through national-level cooperation to large international teams. The workers of the group are significantly more often the first/corresponding authors, than not.	
H1.3	Quality of all outputs and results
Good. Papers in Q2 are most frequent.	
H1.4	The most valuable discoveries and findings in the fields, their importance for the field
Detection of local earthquakes by neural networks; role of crustal fluids in swarm generation and fault weakening; high-resolution tomography of the Bohemian Massif and its anisotropic model; anisotropic lithospheric structure below Fennoscandia; studies of unstable slopes, including fracture detection; new tools for moment tensor inversion and decomposition; development of ray theory in anisotropic media; acquisition of new portable seismic instruments. Active participation in large-scale seismic arrays (PASSEQ, LAPNET, RETREAT, AlpArray, AdriaArray), both instrumental and in terms of processing and interpretation. Participation in a local seismic survey in Iceland. European Facilities for Earthquake Hazard and Risk consortium (2019). International Continental Scientific Drilling Program (2017-21).	
H1.5	Contribution of the participation of the authors in large collaborations
N/A	

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

H2.1	Societal relevance of outputs and results pursuant to CAS and institute mission
Highly relevant. Operation of the seismological service. Seismicity of Western Bohemia.	
H2.2	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
Commendable. Seismic information associated to the seismic monitoring. Slope stability analysis.	
H2.3	Relation to practice
Development of methods applicable in exploration seismology (SW3D consortium).	
H2.4	Participation in AV21 strategy
Active: Programme No. 4 <i>Natural Hazards</i> through activities under the topic <i>Earthquakes and seismic hazard</i> : Two Earthquake Information and Education Centres in Skalná and Kašperské Hory; Film on the West Bohemia Earthquakes; mobile application SEISLOK	
H2.5	Cooperation with regions of the Czech Republic
Active: project <i>Re-excavation and opening up the gallery in the Komorní Hůrka volcano</i> .	

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

D1.1	Comparison of the team with similar international and national institutes
High international reputation of leading individuals; results competitive in national and international context.	
D1.2	Scope and quality of international and national cooperation and the role of the team in such cooperation; engagement in broad international cooperation
Adequate. Cooperation with Charles University: Faculty of Sciences, Faculty of Mathematics and Physics (<i>Seismic waves in complex 3D structures</i> consortium). Engagement in bilateral and multilateral projects, especially for large seismic arrays. PI of International Continental Drilling Program (ICDP) Eger.	
D1.3	Participation of the workers in scientific community activities (organizing of conferences and workshops, invited lectures, awards)
Commendable. Service as Editors (I. Pšenčík, J. Burjánek) and on the Czech Scientific Foundation board (V. Vavryčuk). Co-organization of multiple conferences and workshops. <i>Inge Lehman</i> lecture for ESC (J. Plomerová), J.E. Purkyně fellowship (J. Burjánek), outstanding reviewer in GJI (V. Vavryčuk).	

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

D2.1	Direction in line with the perspective of the planned research directions
Perspective. Establishment of three new research teams. Two of them are led by relatively young researchers; however, they are supported by highly experienced colleagues of retirement age.	
D2.2	Assessment of the previous research objectives and their achievement
The main research objectives were achieved by data acquisition, development of new methods (anisotropic inversion, ray theory, local events processing, focal mechanisms) and their applications in Western Bohemia and elsewhere.	
D2.3	Assessment of implementation of recommendations from past evaluation
Gradual transfer of responsibilities to new generation of scientists, new group created (J. Burjánek, coming from ETH). Significant increase in PR/outreach activities.	
D2.4	Success in receiving grants
Successful on the national level (Czech Science Foundation), no significant contributions from European grants.	
D2.5	Adequacy of instrumental equipment
Adequate, substantially expanded and modernized due to the CzechGEO project, effectively used.	
D2.6	Effectiveness of management
Transformation from method oriented to process oriented managements structures is underway. New team structure allows for holistic approach, however the overarching bundle in coordination is not satisfactory, leading to overlap.	
D2.7	Assessment of professional structure, development strategy and the strategy of keeping best scientists, age structure, career and qualification growth
Best approach in the light of limited funding.	
D2.8	Creating work-life balance conditions, assessment of approach towards possible gender issues
High representation of female scientists in all age groups, support for staff returning from parental leave. Provisional kindergarten with more permanent solution in preparation, part-time work and home office support.	
D2.9	Relation of the team with regard to the integration, development and sustainability of the research centre funded by the National Programme of Sustainability II.
N/A	

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

D3.1	Scope of cooperation with universities on national and international level
Scientific cooperation with Charles University, Institute of Physics of the Earth, Masaryk University, Brno and ETH Zurich.	
D3.2	Effectiveness of joint research centres
Consortium <i>Seismic waves in complex 3D structures (SW3D)</i> in cooperation with Charles University, Faculty of Mathematics and Physics. Long-term cooperation. Theoretical outputs and codes with applications in oil industry and elsewhere.	
D3.3	Success rate in supervision of PhD students
Adequate (4 thesis defended).	
D3.4	Participation of PhD students in the outputs
Adequate, PhD students first authors of at least 2 papers each.	
D3.5	Participation of the team in master or bachelor studies
Adequate (5 Bc, 3 MSc)	
D3.6	Assessment of cooperation intensity with universities in the form of teaching
Teaching at the Faculty of Science, Charles University (B. Růžek, J. Horálek). Adequate, given the long-term low numbers of students in geophysical programs at the Charles University.	

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

D4.1	Sufficiency of media strategy and activities in the area of research popularisation
Significantly increased, two new/renovated education centers, re-opened mining tunnel, frequent participation on Radio and TV.	
D4.2	Publishing activities and its quality
Adequate. Three publications in <i>Vesmír</i> (highly visible science popularization journal in Czech)	
D4.3	Participation in professional organisations in the area of research and development
Adequate. Participation in the European Seismological Commission and other organisations.	

Other comments of the commission:

The commission recommends clear organizational and financial separation of the seismological observatory service from the scientific activities of the seismology teams.

2. Geodynamic Processes Department

Strengths:

Diversity of research directions, of educational background and expertise. The Analogue Laboratory represents a regionally unique source of know-how and equipment for physical modelling.

Weaknesses:

Limited cooperation within the heterogeneous group. Age gap between experienced senior scientists at or near retirement age, and the new generation. There is a lack of real leadership in the main research lines. Lack of cooperation among the different teams within the same institution and others from CAS pursuing similar research topics. There is an evident fragmentation of the Team into entities too distant from each other in their interests. The idea of replacing existing departments into a larger number of research groups, many with younger leaders, will not solve this problem due to the lack of focus and interaction among the teams. Specifically, there is an apparent lack of link and cooperation with the geothermics group.

Opportunities:

Applications for funding at European level. A new cohort of young high quality researchers.

Threats:

The fragmentation (discussed above) needs to be addressed by the management in cooperation with the international Advisory Board. In our assessment, there are on-going projects with overlapping pursuits in other institutes, and this dilutes financial resources available to individuals in the department.

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

H1.1	Quality of selected outputs of Phase I
Good (above average in inter-team comparison)	
H1.2	Contribution of workers on the outputs reached
The author participation spans the entire spectrum from single-institution publications, through national-level cooperation to large international teams. The workers of the group are significantly more often the first/corresponding authors, than not.	
H1.3	Quality of all outputs and results
Average. Papers in Q2 are most frequent.	
H1.4	The most valuable discoveries and findings in the fields, their importance for the field
Study of magmatic and volcanic processes. Dynamics of modern and ancient convergent margins and collisional zones. Development of the analogue modelling laboratory. Study of past greenhouse climate dynamics. Geothermic studies. Surface processes on terrestrial planets.	
H1.5	Contribution of the participation of the authors in large collaborations
N/A	

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

H2.1	Societal relevance of outputs and results pursuant to CAS and institute mission
The justification of the societal relevance of the research activities has been very limited, with the exception of a few actions from the geothermal team and the sedimentary basin group by the study of past climate.	
H2.2	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
Significant in the Gravity & Geodesy group and Geothermics group.	
H2.3	Relation to practice
Steep slope monitoring for open-pit mine (with industrial partner). RINGEN (geothermal energy).	
H2.4	Participation in AV21 strategy
Participation in <i>Natural hazards</i> and <i>Climate changes</i> programmes. Participation in surface temperature forecasts (ICEWARN).	
H2.5	Cooperation with regions of the Czech Republic
Project <i>Indication of old underground workings by geophysical survey</i> (J. Mrlina in cooperation with West Bohemian Region and NPO Erzgebirge).	

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

D1.1	Comparison of the team with similar international and national institutes
High international reputation of some individuals; results competitive in national and international context.	
D1.2	Scope and quality of international and national cooperation and the role of the team in such cooperation; engagement in broad international cooperation
Very broad. German Aerospace Centre (DLR), The Open University (England), University of Lisbon (Portugal), University of Santa Barbara (CA, USA), Slovak Academy of Sciences, University of Liverpool (England), GFZ Potsdam (Germany), Ecole Nationale Supérieure de Géologie, Ludwig-Maximilian-Universität München, Universidad de Concepción (Chile), Hungarian Academy of Sciences, and others.	
D1.3	Participation of the workers in scientific community activities (organizing of conferences and workshops, invited lectures, awards)
Two short courses organized at the Institute of Geophysics. Two Otto Wichterle premiums for young researchers, Hlávka premium, SCIAP award.	

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

D2.1	Direction in line with the perspective of the planned research directions
Establishment of new research teams. Some of them are lead but relatively young researchers with promising future.	
D2.2	Assessment of the previous research objectives and their achievement
The main research objectives were achieved by development of new methods and their applications.	
D2.3	Assessment of implementation of recommendations from past evaluation
Gradual transfer of responsibilities to new generation of scientists, new group created. For example, the Geothermics group was joined in 2016 by Dr. Tomáš Uxa, a young scientist. They increased funding in 2015-19, and higher number of applications including the ERC Junior Grant.	
D2.4	Success in receiving grants
Successful on the national level and the application of an ERC Junior Grant. New bilateral Czech-German project. GAČR-funded research project.	
D2.5	Adequacy of instrumental equipment
Participation in the research infrastructure RINGEN (Research Infrastructure for Geothermal Energy). Development of the analogue modelling laboratory has continued. Effective application of tiltmeters and gravimeters.	
D2.6	Effectiveness of management
Transformation from method oriented to process oriented management structures. New team structure allows for holistic approach, however the overarching bundle in coordination is not satisfactory, leading to overlap.	
D2.7	Assessment of professional structure, development strategy and the strategy of keeping best scientists, age structure, career and qualification growth
Best approach in the light of limited funding	
D2.8	Creating work-life balance conditions, assessment of approach towards possible gender issues
The gender balance is not totally covered. Support for staff returning from parental leave. Provisional kindergarten with more permanent solution in preparation, part-time work and home office support.	
D2.9	Relation of the team with regard to the integration, development and sustainability of the research centre funded by the National Programme of Sustainability II.
N/A	

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

D3.1	Scope of cooperation with universities on national and international level
There is a large list of nominated Universities or Research centers, such as: U. Liverpool, Universidad de Concepción, Chile; Kingston University (UK); Northwestern University (IL, USA); University of Western Ontario (Canada); GFZ Potsdam; University of Leipzig; Slovenian Geological Survey; University Evora. Apparently these large centers offered productive results.	
D3.2	Effectiveness of joint research centres
Cooperation with three universities (Charles University, Technical University Liberec, Czech Technical University), two institutes of the Czech Academy of Sciences (Institute of Geonics, Institute of Rock Structure and Mechanics), the Czech Geological Survey, in the research infrastructure RINGEN (Research Infrastructure for Geothermal Energy).	
D3.3	Success rate in supervision of PhD students
Adequate (2 students)	
D3.4	Participation of PhD students in the outputs
Adequate (3 PhD defended)	
D3.5	Participation of the team in master or bachelor studies
High. (6 BSc, 7 MSc)	
D3.6	Assessment of cooperation intensity with universities in the form of teaching
Intense cooperation in this topic with Charles University Prague	

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

D4.1	Sufficiency of media strategy and activities in the area of research popularisation
Active outreach strategy. Participation in Earth Day, guided tours in Geopark Spořilov, SCIAP 2016 award <i>Barrel organ of plate tectonics</i> (Brož & Machek). Numerous appearances on TV (especially Mars-related: P. Brož).	
D4.2	Publishing activities and its quality
The recently issued comic book “The path of the Seismic Wave” is the single contribution of this team.	
D4.3	Participation in professional organisations in the area of research and development
J. Šafanda has served as the Vice President of the Czech Academy of Sciences (2013-2017) and has been a member of the Scientific Council of Faculty of Science, Charles University, Prague (since 2013) V. Čermák has served as the Chairman of the Committee of the Czech Academy of Sciences for the DSc Research Professor Degree in Geophysics, Geodesy, Meteorology	

and Climatology (since 2004); Member of the Editorial Board of *Studia Geophysica et Geodaetica*.

Petr Brož took part in the evaluation panel NASA Solar System Workings (2018).

Other comments of the commission:

There is an apparent lack of relationship and cooperation between the different groups that make up the department. The duplication of research lines between this department and others in the same institute or in other institutes of the CAS is a strong weakness, since it dilutes resources, human capacity and the ability to apply for high-quality projects.

3. Geomagnetism Team

Strengths:

Educational background of members, international collaborations, recognized experts.

Weaknesses:

Externally funded research needed to continue core research; Declining FTE since 2015; retirements.

Opportunities:

Geodynamo modelling, solidification of binary systems. Expansion of the magnetotellurics team, including prospective hiring of foreign researchers. Archaeoprospection; magnetic properties of soils, soil erosion, soil processes;

Threats:

Magnetotellurics group strongly depends on G. Hill. Expansion and stabilization encouraged.

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

H1.1	Quality of selected outputs of Phase I
Good, slightly below mean of field.	
H1.2	Contribution of workers on the outputs reached
Good, first authorship prevails.	
H1.3	Quality of all outputs and results
Good. Very concise team report.	
H1.4	The most valuable discoveries and findings in the fields, their importance for the field
<p>Environmental magnetism for climate change detection (well established abroad); magnetic properties of andosols; magnetic mapping of the spatial extent and vertical migration of wood ash; sources of air pollution, magnetic properties of dust; MS as auxiliary parameter reflecting soil degradation; modelling of solidification of binary mixtures; inner core and core/mantle boundaries;</p> <p>Effects of geomagnetic disturbances on the lower atmosphere geopotential heights changes, their teleconnection with NAO; stratospheric polar vortex, NAO and Arctic air invasion, geomagnetic storms;</p> <p>Magnetotellurics: Structure of Bohemian Massif/West Carpathians, Western Bohemia, Trans-European Suture; active tectonic processes, partial melting; electromagnetic methods in polar and volcanic regions.</p> <p>Improvements of magnetometer</p>	
H1.5	Contribution of the participation of the authors in large collaborations
N/A	

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

H2.1	Societal relevance of outputs and results pursuant to CAS and institute mission
Space weather, forecasting of magnetic storms. The interaction of magnetic field and solar activity and effects of climate response is a question at the geo-scientific forefront.	
H2.2	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
Significant impact on modern archaeology.	
H2.3	Relation to practice
High potential by identifying natural vs anthropogenic air pollution from magnetic properties.	
H2.4	Participation in AV21 strategy
Methodology for unravelling human history.	
H2.5	Cooperation with regions of the Czech Republic
None reported.	

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

D1.1	Comparison of the team with similar international and national institutes
High international reputation. The leaders are best integrated to international scientific bodies and unions. They have the most distributed international visibility with good scientific record.	
D1.2	Scope and quality of international and national cooperation and the role of the team in such cooperation; engagement in broad international cooperation
Broad cooperation national and international. European Plate Observing System (EPOS IP); SAGA (EU COST Action SAGA-CA17131, archaeo-geophysics and soil science)	
D1.3	Participation of the workers in scientific community activities (organizing of conferences and workshops, invited lectures, awards)
3 international Conferences/meetings/workshops; invited lectures abroad (Hill, Petrovsky); Lumina Queruntur award (Hill).	

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

D2.1	Direction in line with the perspective of the planned research directions
The restructuring of the department into three teams will allow focusing on the planned research in an effective manner.	
D2.2	Assessment of the previous research objectives and their achievement
Contribution to soil degradation research; climate change record in sediments; pollutant tracing; parameter studies of geodynamo; modelling of mushy flows; digitalization of historical geomagnetic observations from Clementinum; magnetotelluric studies of the Bohemian Massif and the West Carpathians.	
D2.3	Assessment of implementation of recommendations from past evaluation
Increased interdisciplinary cooperation; strengthening of the magnetotelluric research.	
D2.4	Success in receiving grants
1 prestigious (Hill), moderate success rate with Czech Science Foundation.	
D2.5	Adequacy of instrumental equipment
Adequate.	
D2.6	Effectiveness of management
Apparently good.	
D2.7	Assessment of professional structure, development strategy and the strategy of keeping best scientists, age structure, career and qualification growth
Promising attempts, partly already successful.	
D2.8	Creating work-life balance conditions, assessment of approach towards possible gender issues
Support to young parents, flexible working time, parental leave.	
D2.9	Relation of the team with regard to the integration, development and sustainability of the research centre funded by the National Programme of Sustainability II.
N/A	

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

D3.1	Scope of cooperation with universities on national and international level
Mostly informal	
D3.2	Effectiveness of joint research centres
N/A	
D3.3	Success rate in supervision of PhD students
Only 1/1	

D3.4	Participation of PhD students in the outputs
Good (1 first author). After defense, student remains part of the team.	
D3.5	Participation of the team in master or bachelor studies
Supervision of several BSc and MSc theses. However, none reported successfully defended.	
D3.6	Assessment of cooperation intensity with universities in the form of teaching
Adequate. Kadlec and Petrovsky teaching at 3 universities.	

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

D4.1	Sufficiency of media strategy and activities in the area of research popularisation
Frequent public lectures, appearance on TV and Radio.	
D4.2	Publishing activities and its quality
Special publication of the IAGA 100 years anniversary (in Czech), one paper in Vesmír (science popularization journal in Czech)	
D4.3	Participation in professional organisations in the area of research and development
Very high; (E. Petrovský president of IAGA, member if IUGG executive committee), J. Šimkanin, P. Hejda (IAGA working groups/divisions)	

Other comments of the commission:

Final report was elaborated by:

Commission 4 - Earth and environmental sciences

Evaluated teams No.: 1, 2, 3

Commission Chair: Prof. (pens.) Dr. Franz Fiedler

Commission Deputy Chair: Jakub Velímský

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Jesus Ibanez

Peter Isaacson

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Thomas Leisner

Willy Maenhaut

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