Evaluation of the Research and Professional Activity of the Institutes of the Czech Academy of Sciences (CAS) for the period 2010–2014

Final Report on the Evaluation of the Institute

Name of the Institute: Institute of Inorganic Chemistry of the CAS, v. v. i.

Fields, in which the Institute registered its teams:

Earth and related environmental sciences

Observer representing the Academy Council of the CAS: Josef Lazar
Observer representing the Institute: Kamil Lang, substitute observer Michael Londesborough

Commission No. 5: Earth and related environmental sciences
Chair: Prof. Dr. Franz Fiedler

Date(s) of the visit of the Institute: October 29, 2015
Programme of the visit of the Institute: see attached Minutes from the visit

Evaluated research teams:
No. 4 - Laboratory of Environmental Geochemical Analysis

A. Evaluation of the Institute as a whole

B. Evaluation of the individual teams

Evaluation of the Team No. 4: Laboratory of Environmental Geochemical Analysis

Report on the Laboratory of Environmental Geochemical Analysis, Institute of Inorganic Chemistry of the CAS

1. **Introduction**. The Laboratory of Geochemical Analysis is a very small albeit highly active and productive research unit of the Institute of Inorganic Chemistry of the CAS, consisting of 1.99 FTE (plus three additional people). The present (and proposed) research primarily focuses on the pollution and architecture of floodplain deposits, intending to apply a holistic approach. The primary study areas include several river-floodplain systems in the Czech Republic (present and planned), including the Jizera, Litavka, Morava, Ohre and Ploucnice Rivers, which suffer from various and partly severe (past) pollution sources. A second research domain covers the stratigraphy of the Miocene fill of the Most Basin. The lead scientist, Dr T. Matys Grygar, is an internationally-recognized researcher in the field of floodplain pollution research. The laboratory seems to be well-equipped and applies advanced techniques such as XFR (X-ray fluorescence spectroscopy), element analyses, gammaspectrometric dating, or ERT (electrical resistivity tomography).

2. **Strengths and Opportunities**. The team has a clear research focus, which is unique in the Institute but also nationally. The research output is rated as very good to excellent – both in respect to the number and the quality of publications. During the evaluation period, the team has published 52 papers in journals with an impact factor. The 3 papers assessed during Phase I are rated as internationally excellent. The team has established unique competences in the specific research domain, as well as a productive network of collaborations. The focus on floodplain systems is considered important, and the development of various tools and techniques (e.g. fingerprinting techniques) is excellent. There exists an immense but largely unexplored opportunity to put the research into a broader environmental and ecological context. Indeed, floodplains are strategic ecosystems of global importance, which requires a holistic approach by integrating hydrological, geomorphic, ecologic, and socioeconomic aspects.

3. **Weaknesses and Threats**. A performance of research of a team of such a size depends on single individuals, which makes it also a highly fragile team. In addition, the laboratory seems to be not well integrated into the Institute of Inorganic Chemistry, although there might be unexplored opportunities for collaborations.

4. **Recommendations**. The research outputs on floodplain pollution and architecture are very good to excellent; however, there are obviously major overlaps in research between this team and the department of Environmental Geology and Geochemistry, Institute of Geology of CAS. An integration of both teams into one department may increase scientific prestige and foster cooperation with complementary national and international institutions. Furthermore, the Director demonstrated little interest in, and little influence on, the research being carried out by Dr Matys Grygar. It should be seriously considered if the work would be better carried out in another Institute, e.g. the Institute of Geology, or even the Biology Centre.

5. **Detailed evaluations**.

a) The research team covers a topic of high scientific and societal relevance. The publication record of the team is very good, being at an internationally competitive level. Overall, the laboratory performs very well scientifically.

b) Considering the rather small team, it is recommended to further bundle the competences and to focus the research activities. At the same time, strategic collaboration with leading partners, nationally and internationally, may help putting the specific research into a broader context. This may include the broader application of fingerprinting techniques, research on the fate and remobilization of pollutants (remediation strategies, food web integration), or the development of integrated floodplain models. Research should develop from descriptive towards a more predictive approach.

c) The laboratory carries out service work as well. There needs to be a good balance between the benefits and the trade-offs of such service work. The service work should strengthen the core research activities as much as possible and may help to better communicate the research results to the broader scientific community and the general public alike. At least a clear strategy regarding the service work should be in place.

d) Only one doctoral student and three master students finished their theses during the reporting period. A clear strategy, together with universities, is required to increase the numbers of students at the master and doctoral level in the laboratory.

e) The overall strategy and the future research plan of the team are clear, with a strong focus on polluted floodplains of the Czech lowland rivers, which again is part of a major project funded by the Czech Science Foundation. Paleoenvironmental interpretation of Miocene sediments is expected to be a further research topic, in close cooperation with University in Bremen (Germany).

f) The Laboratory should explore with other Institutes (e.g., the Institute of Geology, or the Biology Centre) whether this Laboratory would fit better there than in the Institute of Inorganic Chemistry.

Date: December 28, 2015

Commission Chair: Prof. Dr. Franz Fiedler