

FUTURE CHALLENGES IN THE MINERAL SCIENCES

“We aim to identify 100 mineralogical questions that, if answered, would have the greatest impact on resolving current and future challenges in the Earth, planetary and environmental sciences.”

Defining the major future research challenges in the mineral sciences provides a real opportunity to demonstrate the critical importance of our discipline to a wide audience of academics, funders, politicians and the public. The exercise will reveal not only the healthy nature of the mineral sciences and how they can be used strategically, but also how the mineral sciences are an essential contributor to human prosperity. Such exercises have been undertaken by other disciplines, and they have proved very successful in demonstrating the international nature, range and relevance of those disciplines to the academic community and society in general. Such exercises can help influence the future research agenda and enable scientists to engage with funding bodies to agree on funding priorities. In the current climate of funding scarcity, coupled with the ever-increasing demand to demonstrate the societal “impact” of our research, it is essential that we raise the profile of mineralogical research and demonstrate how it will contribute to solving key Earth science problems, both fundamental and applied. This initiative will allow us to talk with authority when dealing with the funders of our research, especially government agencies and industry, and convey the importance of what we do (and why they should pay us to do it!).

An example of a successful approach, which has proved extremely effective for the conservation-biology community, is the publication of community-led papers defining the “One Hundred Questions of Importance” in a given field of research (Sutherland et al. 2009). In this particular exercise, the international community identified 100 scientific questions which, if answered, would have the greatest impact on conservation practice and policy. Representatives from international organizations, regional sections and working groups of the Society for Conservation Biology, and academics from all continents except Antarctica compiled 2291 questions of relevance to the conservation of biological diversity worldwide. The questions were gathered from individuals through workshops, e-mail requests and discussions. Voting by e-mail to establish a shortlist of questions, followed by a 2-day workshop, was used to derive the final list of 100 questions. Inevitably several of the questions developed clear themes. A previous exercise (Sutherland et al. 2006) was very widely read, thus revealing considerable interest in this approach; it was the most downloaded paper ever from any British ecological society journal and was the third-most downloaded paper from Blackwell Publishing’s 850 journals in 2006. A more recent “100 questions” exercise in agriculture (Pretty et al. 2010) is already the most downloaded paper from the publisher’s website – generating several thousand downloads in the first month – and the paper is informing discussions in Brussels and at the UN rapporteur on food.

The international mineralogical community is invited to participate in a similar exercise for the mineral sciences. This exercise seeks to identify 100 mineralogical questions which, if answered, would have the greatest impact on resolving the Earth, planetary and environmental science challenges that we will face over the coming decades. The challenges confronting Earth scientists are relatively well defined (e.g. climate change, energy security, resource sustainability, environment protection, waste management, geological hazards, etc.). What is less well appreciated (by funding bodies at least) is that many of these challenges have a key mineralogical component and that they require the unique knowledge, insight and expertise of mineral scientists in order to overcome them. By identifying these issues explicitly and by framing them in terms of well-defined, answerable scientific questions, we will significantly raise the profile of the mineral sciences, emphasizing their



importance not only to funding agencies and policy makers but to the public at large. This is a chance for the mineral science community to define what it stands for and re-establish the discipline’s central importance within the wider scientific community.

The success of the exercise relies on the participation and support of all areas of the international mineralogical community. I believe that this initiative is best led by mineralogical societies/associations and international bodies, with input from any relevant individuals or bodies in universities, public research institutions, funding organizations, industry, policy makers and entrepreneurs. The mineralogical societies have a unique opportunity to mobilise the mineralogical community globally and provide an authoritative, unbiased and balanced assessment of what the key mineralogical challenges are.

PROPOSAL

Participants

The success of such an exercise relies on wide participation from all sections of the community, including (a) national and international academic societies and (b) industry, combined with more holistic input from (c) national and international funding bodies and (d) government agencies/policy makers.

Individuals, groups and societies/associations will be asked to solicit question submissions from their memberships, solicit questions from industry and other relevant bodies, participate in a workshop to compile the final list of 100 questions and participate in writing the final published paper.

Submission of Questions

Submission of questions will be managed through a central website and will be open to any group or individual wishing to participate. The web-based submission form will consist of the following sections:

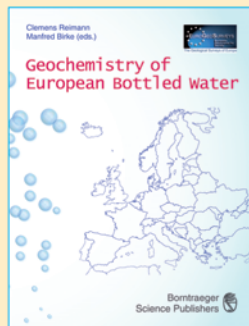
- a text box for the question itself, limited to 50 words
- a text box for brief explanatory notes
- an optional box for the name and affiliation of the submitter or group
- a box to indicate the country of residence of the person submitting the question
- a box to indicate whether the question comes from somebody in academia, industry, government or other
- a tick box confirming the submitter’s permission for their question to be used in discussions and/or to be published
- a tick box to confirm the submitter’s willingness to have his/her name and affiliation identified in the supplementary material

The submission period will last until 30 November 2011.

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Geochemistry of European Bottled Water

Ed.: C. Reimann; M. Birke



This book is the first state of the art overview of the chemistry of groundwaters from 40 European countries from Portugal to Russia, measured on 1785 bottled water samples, equivalent to 1189 distinct bottled water brands from 1247 wells in 884 locations plus an additional 500 tap water samples acquired in 2008 by the network of EuroGeoSurveys experts all across Europe. All data on accompanying CD.

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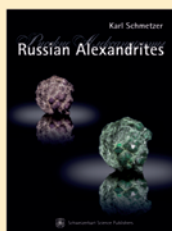
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Shortlisting of Questions

After web submission has closed, a list of all submissions will be circulated to representatives of the participating organizations. Questions will be grouped and rephrased as there will be inevitable overlap. The prioritization process will be as inclusive as possible. The resulting list of priority questions will be circulated to all national representatives/societies. These will be taken forward to the final workshop.

Workshop

A two-day workshop (planned for early-mid 2012), will be attended by representatives of the participating bodies and will determine the final list of 100 questions. The short-listed questions will be subdivided into key areas. Groups of representatives will be asked to consider one or more of the key areas, according to their expertise, with the aim of eliminating, modifying and combining questions to create a democratically agreed-on final list. Finally all representatives will be asked to agree on the final set of 100 questions that will form the basis of the final publication.

Publication

The list of questions will be published in *Mineralogical Magazine* as an open access paper so that all participating bodies will be free to post the paper on their websites and all individuals will be able to download the paper free of charge. The paper will be organized into sections according to the key priority areas identified during the short-listing process. Each section will be accompanied by an introductory text. All representatives of participating bodies will be named as authors on the paper. A document containing a list of all submitted questions will be made available as supplementary material, along with the names and affiliations of those who opt to submit such information.

Supporters

The following have endorsed the '100 questions' initiative:

- C. AYORA IBÁÑEZ, President, Sociedad Española de Mineralogía
- D. BISH, President, Mineralogical Society of America
- N. COOK, President, International Association for the Geology of Ore Deposits
- J. DE YOREO, President, Materials Research Society
- Y. GU, President, International Council for Applied Mineralogy
- R. KRYZA, President, Mineralogical Society of Poland
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- S. POLI, President, Società Italiana di Mineralogia e Petrologia
- P. SCHROEDER, President, Clay Minerals Society
- E. TILLMANN, President, International Mineralogical Association
- M. WIEDENBECK, International Association of Geoanalysts

Promotion of the Exercise

Once the final list is published, it is hoped that the representatives of participating bodies, and others, will use it as an opportunity to promote mineralogical research through press releases and other public-engagement activities, as well as in discussions with policy makers and funding bodies.

For more information about the exercise and how to participate, or to register your interest in becoming a representative, please visit our website (www.100-questions.org). The anticipated go-live date for the submissions website is 30 June 2011.

Richard Harrison
University of Cambridge

REFERENCES

Pretty J and 54 coauthors (2010) The top 100 questions of importance to the future of global agriculture. *International Journal of Agricultural Sustainability* 8: 219-236, doi:10.3763/ijas.2010.0534

Sutherland WJ and 38 coauthors (2006) The identification of one hundred ecological questions of high policy relevance in the UK. *Journal of Applied Ecology* 43: 617-627, doi:10.1111/j.1365-2664.2006.01188.x

Sutherland WJ and 43 coauthors (2009) One hundred questions of importance to the conservation of global biological diversity. *Conservation Biology* 23: 557-567, doi: 10.1111/j.1523-1739.2009.01212.x