

**Report on Workshop for:
“Xenoliths & GeoFrame: Supporting New Science with Advanced Data
and Sample Management”**

Organizers: Kerstin Lehnert and Doug Walker

*May 28, 2006; 3pm – 5:30 pm
New York City, Columbia University*

The EarthChem effort is working toward integration of existing databases on geochemistry in a One-Stop-Shop for geochemistry. It is also identifying, through community outreach and consensus, new and critical databases that need to be developed. The first major undertaking will be the compilation of information for xenoliths; this was identified in the EarthChem proposal and endorsed by both reviewers and the EarthChem Advisory Committee. This effort is especially timely in that a comprehensive xenolith database was identified as a critical need to the geological and geophysical community in relation to the GeoFrame initiative associated with EarthScope (see EOS article by Tikoff and others, 2006).

To ensure that the xenolith compilation meets the needs of the community, is inclusive as possible, and contains the critical data and metadata, the EarthChem organizers ran a small workshop on xenoliths in conjunction with the 2006 GERM meeting. The workshop was attended by 15 participants representing a broad range of the geosciences community (see list at end of document).

The workshop group and organizers identified the following as critical issues and aspects for the database.

- 1) Both upper mantle and lower crustal xenoliths are important. Mantle xenoliths present a reasonably well-defined problem, whereas lower crustal samples add potential complexity. Starting with mantle xenolith was identified as the first step in the process of constructing a database.
- 2) Metadata must be as complete as possible, including the location, analytical methods, and other routine items. This follows closely the current philosophy and approach of the EarthChem effort. Fabric descriptions and images of samples and thin sections should be included. For example, textural information is often known (granular or sheared) and must be recorded. Lastly, facies (e.g., spinel, garnet, etc.) should be specified.
- 3) Pressure-temperature or temperature data derived from xenolith analyses are of broad utility to a wide range of geoscientists. The geophysical community utilizes PT data to compute geothermal gradients that are important in modeling. Although these data are derived in the sense that they are computed using a geochemical model, they should be included in the database. They should be identified as derivative data (much in the way

geochronological ages are specified), have the method of calculation specified, and possibly contain raw data so that other interpretations can be calculated by the database users. This means that mineral data must be part of the database in its initial version.

4) To the extent possible, the chemistry and age of the host igneous rock should also be included. Background crustal ages and tectonic history should also be included if known.

The next steps and approximate timetable and participants.

1) The first consultants to the database effort will be William McDonough, Richard Carlson, Mihai Ducea, Cyn-Ty Lee, and Jane Selverstone.

2) William McDonough has already compiled an extensive database of xenoliths, although not with enough metadata or other of the desired attributes. From this he will identify about 15 key papers to use to start testing data entry into a newly constructed database for xenoliths built initially from the existing PetDB database. This will be done with EarthChem data entry personnel and programmers.

3) A demonstration database should be put together by the end of July 2006, to demonstrate at the Goldschmidt Conference in Melbourne. Sue Brantly (president, Geochemical Society) has agreed that the society will co-sponsor a town hall meeting, held in conjunction with the Melbourne conference, on xenoliths to provide more community feedback and input. A similar town hall will be planned for Fall AGU meeting. In addition, McDonough will organize an email list of key participants (see list below).

4) A page will be added to the EarthChem site for xenoliths. This will provide access to the database as well as giving information about the system.

5) The International Kimberlite Committee will be contacted soon in anticipation of the 2008 meeting of this group.

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References:

Tikoff, B., van der Pluijm, B., Hibbard, J., Keller, G.R., Miller, E.L., Mogk, D.,
Selverstone, J., and Walker, D., 2006, An integrated geological framework for
EarthScope's USArray: EOS, Transactions, American Geophysical Union, vol.
87, no. 23, p. 221-222.