A Global Approach to Global Earth Science Problems

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Statement of Problem: Ongoing global political and economic changes are increasing the demands for resources domestically and globally and increasing the need for hazards mitigation. The USGS, particularly the Geology Discipline, is arguably the most qualified entity to make a positive impact on these issues. The growth of major resource-user nations (US, China, India, Europe, etc) increases the demands for resources of all kinds (water, minerals, energy, concrete, etc), making them less plentiful to the US. For example, a recent CIA report suggests that international strife will likely result by 2015, fueled by limited resources. Furthermore, growth in these nations occurs increasingly in areas that are susceptible to hazards (earthquakes, volcanoes, floods, hurricanes, fires, drought, etc), and global warming will likely compound the hazards issue. Such geoscientific problems require global solutions. The USGS, as a global leader in the geosciences, needs to seek solutions to those problems, but funding for the needed science is unlikely to be forthcoming from the US alone or from any single country. Because the Earth is a global laboratory, scientific break-throughs will likely be expedited when world-class scientists work globally together.

Objectives: The USGS (Geology) should organize an international consortium of geological agencies from various countries that focuses on global problems in the geosciences. Many geoscience problems are local and would not be included in the international consortium, but the other geoscience problems have only global solutions. Within the international consortium, countries with specific concerns would work jointly to solve those specific problems (for example, countries that have significant earthquake hazards issues (e.g., US, Japan, Taiwan, China, Chile, India, etc.), water resource problems (most of the world), energy problems (most of the world), or volcano hazards issues (US, western South America, Caribbean, Japan, etc.) would work within the consortium as sub disciplines.

Work Strategy: The USGS should propose, organize, and lead an international geoscience consortium of countries that focuses on major areas of the geosciences that require global solutions. Participating countries, USAID, the World Bank, etc. would fund the consortium. Sub disciplines within the consortium would focus on topical areas (water, earthquakes, volcanoes, minerals, floods, etc.). The USGS already works globally to understand global geoscience problems, but the effort is poorly funded or is often funded (by USAID) only in the aftermath of a major disaster. The USGS currently collaborates in this manner with a few specific countries, but these collaborations often involve the initiative of a single USGS scientist with his/her counterpart in the host country. A concerted effort of the best minds (globally) is needed.

Relevance and Impact: The international consortium could tackle tough geoscience problems that the USGS alone could never afford to solve. For example, seismologists know that large arrays of seismographs are needed to make significant advances in understanding earthquake and volcano hazards, but although the US has an Advanced National Seismic System (ANSS), it is poorly funded, and it has only a fraction of the instrumentation originally envisioned – due to limited funding. By comparison, Japan and Taiwan are densely instrumented and spend much more on research and mitigation. These countries are moving ahead of the US in developing solutions, such as an earthquake early warning system. An international consortium could tackle individual problems in various sub disciplines by spreading the costs across many countries, and all affected countries would benefit. Significant scientific advances, safer world populations, and more stable economies are just a few of the benefits of such an effort.

Partnerships: Partnerships could include any nation, and within the US, agencies such as NASA (surface observations), NOAA (sea observations), the State Department (USAID), etc. would be major players. Other major US partners might include the petroleum industry, which is the world leader in understanding the subsurface. In the US, both the Government and the private sector would benefit from such a consortium, if the political obstacles could be overcome.