

Leveraging Academic Expertise to Improve Earthquake Monitoring

Susan Beck¹, Göran Ekström², Karen Fischer³, Arthur Lerner-Lam²,
Anne Meltzer⁴, Andrew Nyblade⁵, Eric Sandvol⁶, **Raymond Willemann⁷**

1. University of Arizona, USA, slbeck@email.arizona.edu
2. Columbia University, USA, ekstrom[lerner]@ldeo.columbia.edu
3. Brown University, USA, karen_fischer@brown.edu
4. Lehigh University, USA, ameltzer@lehigh.edu
5. Pennsylvania State University, USA, andy@geosc.psu.edu
6. University of Missouri, Columbia, USA, sandvole@missouri.edu
7. IRIS Consortium, USA, ray@iris.edu

ABSTRACT

Government investments in high-fidelity digital seismograph networks and community development of standards have created a global infrastructure for earthquake monitoring with few technical impediments to data sharing and real-time information exchange. Despite renewed commitment since the 2004 Indian Ocean tsunami, international development organizations, with notable exceptions, have been relatively passive in discussion of how the existing earthquake monitoring infrastructure could be leveraged to support risk-reduction programs and meet sustainable development goals. At the same time, the international seismological community has built research and education initiatives such as EarthScope, AfricaArray, and similar programs in China, Europe and South America, that use innovative instrumentation technologies and deployment strategies to enable new science and applications, and promote education and training in critical sectors.

Can existing models of international collaboration ensure sustainability of global earthquake monitoring? Can academic institutions work with development agencies to meet development and natural hazard risk reduction goals? The IRIS International Working Group explores the link between the activities of IRIS Members and the missions of international development agencies. Seismologists' interests are served by encouraging development of modern seismographic systems around the world to collect data for research as well as hazard mitigation and other national interests. Activities of the Working Group include communicating the benefits of geophysical infrastructure and training to disaster risk reduction programs within the United Nations and development banks, coordinating long-term loans of retired data loggers to network operators in foreign countries, and developing a white paper on the international role of IRIS.

The Working Group convened a workshop, "Out of Africa", on modernizing geophysical infrastructure in the Americas and Southeast Asia through projects that are tied to university education and research. Workshop participants found surprisingly close parallels between geophysical infrastructure in the predominantly low-income countries of AfricaArray with low risk of geophysical disasters and the mostly middle-income countries of Southeast Asia and the Americas with high risk. Except in larger countries of South America, participants reported that there are very few geophysicists in research and observatory operations, that geophysical education programs are nearly non-existent even at the undergraduate university level, and that many monitoring agencies continue to focus on limited missions even though closer relationships with researchers could facilitate new services that would make important contributions to disaster mitigation and sustainable operations.

Building sustainable earthquake monitoring systems requires well-informed cooperation among companies that manufacture components or deliver complete systems and the government or other agencies that will be responsible for operating them. Many nations or regions with significant earthquake hazard lack the technical and human resources to establish and sustain permanent observatory networks required to return the data needed for hazard mitigation. On the compressed time scale of disaster recovery, it can be difficult to find reliable, disinterested information sources. Drawing on unsurpassed educational capabilities of its Members working in close cooperation with its facility staff, IRIS is writing a guide on decisions about network design, installation and operation. The intended primary audience would be government officials seeking to understand system requirements, the acquisition and installation process, and the expertise needed operate a system. The guide would cover network design, procurement, set-up, data use and archiving. Establishing permanent networks could provide a foundation for international research and educational collaborations and critical new data for imaging Earth structure while supporting scientific capacity building and strengthening hazard monitoring around the globe.

Key words: Natural Hazards, Economic Development, Sustainability, Earthquake Monitoring, Observatory Networks.

PRESENTER'S BIOGRAPHY

Raymond Willemann, the IRIS Director of Planning and Community Activities since 2005, coordinates the activities of the IRIS International Working Group. From 1998 to 2003 he was the Director of the International Seismological Centre and from 1992 to 1997 he filled a variety of roles in GSETT-3 and at the Prototype International Data Centre for the CTBTO.