Geophysical Research Abstracts
Vol. 13, EGU2011-4322, 2011
EGU General Assembly 2011
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Geophysical infrastructure, seismological research, and earthquake hazard assessment: Bridging the gap.

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Over the past quarter century, investments in high-fidelity digital seismograph networks have resulted in a global infrastructure for real-time in situ earthquake monitoring. Standards for data acquisition, archiving, and exchange have significantly improved earthquake monitoring capabilities, lead to major science advances, and established a foundation for research, education and training. At this point, there are few technical impediments to establishing appropriate geophysical monitoring systems to collect and analyze data for effective hazard assessment and risk reduction programs. What remains unclear is whether existing models of international collaboration will ensure the stability and sustainability of global earthquake monitoring, and how best to develop the technical infrastructure and human capacity in low and middle income countries to implement and sustain the programs required for effective earthquake monitoring, hazard assessment, and risk reduction. International responses to the 2004 Sumatra earthquake and Indian Ocean tsunami, and the 2010 earthquakes in Haiti and Chile underscore the need for linking commitments to natural hazard risk reduction and capacity building to broader programs in education, urban development, poverty alleviation, and adaptation to environmental stress.

Recent research and education initiatives such as EarthScope, AfricaArray, and similar programs in China, Europe and South America, use innovative instrumentation technologies and deployment strategies to enable new science and applications. At the same time in many parts of the world local and regional seismic networks are seeing new investments in technical infrastructure. These efforts provide opportunities for the international seismological community, comprising universities and government seismological surveys, to promote education and training not only for hazard mitigation but also more broadly for resource exploration and environmental geophysics. These initiatives also provide an opportunity for the international seismological community to more effectively engage international development organizations, including those concerned with pre-event mitigation and post-disaster humanitarian response in discussions of how seismological infrastructure can be leveraged to support risk-reduction programs and meet sustainable development goals.

Recognizing there is a communication and a knowledge gap, IRIS International Development Seismology (IDS) seeks to link the interests and capabilities of the seismological community to the missions of international development agencies. New efforts are being directed toward developing the partnerships, technical infrastructure, and human capacity required for effective international cooperation to accelerate scientific progress, and to ensure that scientific progress enables socially relevant outcomes. Critical to this effort is addressing local needs and concerns, understanding agency missions, and developing long-term partnerships. IRIS IDS efforts to date include communicating the value of geophysical infrastructure and training to disaster risk reduction programs within development agencies, developing education and training programs to address the needs of local monitoring agencies, developing closer relationships between monitoring agencies and researchers to facilitate new services that could contribute to disaster mitigation, development of a guide to sustainable network operations, modernizing geophysical infrastructure, organizing workshops in data management, processing, analysis, and regional data exchange, and an intensive effort to contribute to the responses to recent earthquake disasters in Haiti and Chile. These activities are undertaken in partnership with other institutions, agencies, and seismological organizations outside of the U.S., because both IRIS and potential funding agencies recognize that collaboration is essential for designing programs that serve needs in each region. These activities promote strategies that simultaneously support fundamental research and contribute to reducing global population vulnerability to seismic hazards

through adoption of appropriate best practices and development of public awareness.