

Earthquakes Triggered by Dams



Sichuan earthquake damages building, 14 May 2008 (*Miniviki*)

Earthquakes can be induced by dams. Globally, there are over 100 identified cases of earthquakes that scientists believe were triggered by reservoirs (see [Gupta 2002](#)). The most serious case may be the 7.9-magnitude [Sichuan earthquake](#) in May 2008, which killed an estimated 80,000 people and has been linked to the construction of the [Zipingpu Dam](#).

How Do Dams Trigger Earthquakes?

In a paper prepared for the World Commission on Dams, Dr. V. P Jauhari wrote the following about this phenomenon, known as [Reservoir-Induced Seismicity \(RIS\)](#): "The most widely accepted explanation of how dams cause earthquakes is related to the extra water pressure created in the micro-cracks and fissures in the ground under and near a reservoir. When the pressure of the water in the rocks increases, it acts to lubricate faults which are already under tectonic strain, but are prevented from slipping by the friction of the rock surfaces."

Given that every dam site has unique geological characteristics, it is not possible to accurately predict when and where earthquakes will occur. However, the International Commission on Large Dams recommends that RIS should be considered for reservoirs deeper than 100 meters.

What Are Some Characteristics of RIS?

A leading scholar on this topic, Harsh K. Gupta, summarized his [findings on RIS worldwide](#) in 2002:

- Depth of the reservoir is the most important factor, but the volume of water also plays a significant role in triggering earthquakes.

- RIS can be immediately noticed during filling periods of reservoirs.
- RIS can happen immediately after the filling of a reservoir or after a certain time lag.

Many dams are being built in seismically active regions, including the Himalayas, Southwest China, Iran, Turkey, and Chile (see [map](#)). International Rivers calls for a moratorium on the construction of high dams in earthquake-prone areas.

[Click here](#) for the factsheet on RIS worldwide.



Kariba Dam on the Zambezi, 2005 (*Ben Bird*)



100 days after the Sichuan earthquake (*Li Zheng /IFRC*)

More information:

Case Studies

- [Zipingpu Dam \(2008\)](#)
- [Kariba Dam \(1963-1983\)](#)
- [Google map of other RIS sites worldwide](#)

News Articles

- [Possible Link Between Dam and China Quake, *The New York Times*](#)
- [Reservoir Linked to Deadly Quake in India - Killari Reservoir Could Have Induced Latur Earthquake, *Science News*](#)

Blogs and Commentary

- [China Earthquake a Dam-Induced Disaster? *International Rivers*](#)
- [Top 5 Ways to Cause a Man-Made Earthquake, *Wired*](#)
- [Debunking the Debunkers: Dams Really Can Trigger Quakes, *International Rivers*](#)

Other Publications

- [Kerr, R. and Stone, R. \(2009\), "A Human Trigger for the Great Quake of Sichuan?." *Science* 323: 322](#)
- [Gupta, H.K. \(2002\), "A review of recent studies of triggered earthquakes by artificial water reservoirs with special emphasis on earthquakes in Koyna, India." *Earth-Science Reviews* 58: 279-310](#)
- [Chen, L.Y. and Talwanim P. \(1998\), "Reservoir-induced Seismicity in China." *Pure and Applied Geophysics* 153: 133 - 149](#)
- [Assumpção, M. et al. \(2002\), "Reservoir-Induced Seismicity in Brazil." *Pure and Applied Geophysics* 159 \(1-3\): 597-617](#)

Contact us:

Peter Bosshard
peter@internationalrivers.org
+1 510 848 1155

<http://www.internationalrivers.org/en/node/3845>