

## Question & Answer

Q: Are the presentation files available somewhere?

A: Some presentation files, questions and answers have been posted on the website of IUGS Task Group on Geohazards.

Q: Disaster and Catastrophe should be distinguished. Many Disasters become Catastrophe because they have created big cities in the alluvial lowlands. What are some possible ways to avoid it?

A: There is an idea of a hazard-resistant society. A hazard-resistant society is defined as one that has the ability to resist, absorb, accommodate, adapt to, transform, and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions through risk management. Research is being conducted in various places on how to build a hazard-resistant society. It is also being researched by the Special Committee for Natural Disaster Engineering, Social and Environmental Engineering Research Liaison Committee of the Science Council of Japan.

[http://www.sci.go.jp/ja/info/kohyo/17htm/17\\_36.html](http://www.sci.go.jp/ja/info/kohyo/17htm/17_36.html)

Q: Onland GPS systems are useful for onland landslides, but do you have any monitoring systems associated with underwater GPS systems for the expected next trench type giant earthquake in the Nankai Trough? I have heard that we have set onland 1500 GPS systems without any underwater GPS systems (due to costs?) after the 1995 Hanshin-Awaji Earthquake, and I have heard that those onland systems were not working well.

A: Onland GPS systems can be used to know the long-term ground motion in Japan. We know well the strain distribution, and we could understand a hidden strain zone where occurs many earthquakes. These knowledges contributed our disaster mitigation plan. And then we have set many seismometers after the 1995 earthquake. We have made Japanese earthquake early warning system in terms of these seismometer network. You may listen the discomfort sound at several seconds before the big earthquake from your smart phone and/or TV. Those systems are provided by the onland GPS systems.

Q: After the 2011 Tohoku Earthquake, underwater GPS systems were deployed along the Japan Trench, but I think that we need to deploy the GPS systems along the Nankai Trough before the next giant earthquake. How is present situation about it?

A: We have deployed underwater discrete GPS systems before the 2011 Tohoku Earthquake, and we have detected 50 m submarine seabed motion from east to west after the earthquake. Also, we have deployed and monitored the seabed motion along the Nankai Trough. As you may know, we have set wired seismo- tsunami- meters along the Japan and Nankai Trough as so called DONET system series. We may be able to detect the next tsunamis by these systems.

Q : Our common problem is differentiating the candidate tsunami deposits from storm wave deposits. Do you have any experience on differentiating between the two deposits?

A: This is a critical issue of paleotsunami research. There are several review papers how to differentiate these deposits (e.g., Morton et al., 2007 Sedimentary Geology) but we consider there is no universal method so far.

Q: Thanks for the great talks - My team and I are happy to help with development of the model. For publication you could use one of the AGU or EGU platforms or go through IOC itself.

A: Thanks for the constructive suggestion.

Q : Landslides occur frequently under the mountain roads, and forest diebacks are occurring. Is it related to changes in groundwater veins?

A: It is known that tree diebacks, landslide and groundwater structures are closely related phenomenon. In a general case of landslide-related tree dieback, it is reported that a zone of tree dieback is formed due to a decreasing in groundwater level within the landslide body after the landslide moved, especially around the scarp and crown cracks

at the top of the landslide. On the other hand, as an extreme case, if in an improper designed mountain road site where the flow of groundwater and surface water is dammed by the road construction, embankment, and then trees die due to localized wetland in mountain side or dryland in valley side, landslides possibly occur after the tree diebacks.