

India's Plan for Tsunami Warning System in South China Sea: An Analysis

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When India first announced its plans of setting up a Tsunami Warning System (TWS) in South China Sea (SCS) region, these evoked a negative reaction from China. However, China later rescinded its initial inhibitions, with the Chinese Foreign Ministry declaring that improving the efficiency of the TWS in the region would serve the interests of all parties involved.¹

India, which was one of the countries that was extremely adversely affected by the 2004 tsunami, had set up the Indian Tsunami Early Warning System (ITEWS) at the Indian National Centre for Ocean Information Services (INCOIS), Hyderabad, operating under the Earth System Sciences Organization (ESSO), Government of India. Having achieved considerable success in running the ITEWS, India now wishes to venture into the SCS. According to M Rajeevan, Secretary of Ministry of Earth and Sciences, the plan is still at a nascent stage and is yet to be officially sanctioned. Despite expressing the expected initial scepticism, Beijing eventually approved any prospective construction of TWS in the South China Sea.²

After the tsunamis of 2004, the United Nations Educational, Scientific, and Cultural Organization (UNESCO) set up the Pacific Tsunami Warning and Mitigation System (PTWS), through its Intergovernmental Oceanographic Commission (IOC), for immediate detection of tsunamis and to promote the exchange of data. The PTWS issued warnings to the SCS region as well. Around the year 2013, Chinese media widely reported that a Chinese proposal to build a TWS in SCS had been approved by the IOC and the responsibility for construction of the centre had been delegated to China's National Marine Environmental Forecasting Center.³

This issue brief attempts to explain why the SCS region may require a TWS, assesses India's potential to build one, tries to identify appropriate nations with whom India can cooperate, and lastly, tries to analyse the implications that any construction of this sort might have on the broader Sino-Indian relationship.

The Imperative

Contrary to the popular belief that the SCS littoral states are not prone to tsunamis owing to the semi-enclosed geography of the SCS, it has been recently discovered by scientists from the Earth Observatory of Singapore (EOS) that all the coastal states in the aforementioned region in general, and the South China Coast, Hainan Island, and Vietnam, in particular, fall in the high tsunami hazard zone.⁴

The risk of a devastating tsunami that looms in this region owes its origin to the Manila Trench lying to the west of Luzon (in the Philippines), which has striking resemblance to that of the source areas that caused the Indian Ocean tsunami in 2004, and also to the Japan trench from where the Tohoku-Oki earthquake took place in 2011.

The underestimation of tsunami hazards in SCS region can be attributed to the normally and widely used approach that is based on a uniform slip model.⁵ It fails to fully comprehend the gravity of the situation because SCS is a narrowly confined and smaller area in comparison with the Pacific Ocean or the Indian Ocean region.

Since earthquakes rupture heterogeneously, on application of the heterogeneous slip approach,⁶ it was discovered that the threat to Taiwan, Luzon, southern China and Vietnam specifically, had been underestimated gravely.

Therefore, setting up of a TWS in SCS will be a useful addition to the existing tsunami warning centres such as the Pacific Tsunami Warning Center situated in Hawaii and the Japan Meteorological Agency based in Tokyo, since these confine their area of focus to tsunamis generated by Pacific-rim earthquakes.

The announcement of India's plans to set up a TWS in the SCS region and the subsequent approval of India's plans by China leads to the question of whether India is capable enough to translate its plan into reality and actually set up a TWS that can serve the interests of regions that will be critically hit if a tsunami takes place.

India's Potential Role

The Indian Tsunami Early Warning Center (ITEWC), which was established at INCOIS, Hyderabad, is an independent body operating directly under the Ministry of Earth Sciences, and is subjected to continuous improvement in order to render it capable of

issuing tsunami advisories for any tsunamigenic event taking place in any of the Earth's oceans.

The organisation consists of a real-time seismic monitoring network of 17 broadband seismic stations to detect earthquakes that can cause tsunamis, a network of real time sea level sensors with four Bottom Pressure Recorders (BPR) in the open ocean and 25 tide gauge stations situated at various coastal locations that monitor tsunamis, and a 24x7 active tsunami warning centre that is capable of providing necessary timely advisories to communities that can be detrimentally affected by a tsunami. The existing mechanism can also receive information about any earthquake with a magnitude of over 6.5 M from global networks all over the world. It is a state of the art early warning centre that has the required infrastructure for receiving real-time data from seismic and sea-level sensors, data analysis, modelling of tsunami, and information dissemination, guided by a comprehensive set of Standard Operating Procedure (SOP).⁷

The center can also use email, fax, SMS, and GTS, in order to forward advisories to the relevant authorities within a span of ten minutes after detection of tsunamigenic earthquake in the IOR and oceanic regions as well. It is also one of the Regional Tsunami Advisory Service Provider (RTSP) in the IOR, along with Australia and Indonesia.⁸

The TWS in the IOR has been in place and functioning well for a long period of time. In contrast, the TWS in the SCS lag far behind the IOR system in application of the impact of hazards towards averting the risk of tsunami and land planning, because of the reasons discussed.⁹ Therefore, India can be a significant provider of tsunami warning products and information to the existing TWS in SCS and can contribute considerably to its improvement.

Also, according to the Ministry of Earth Sciences, since all the oceans on Earth are interconnected, any tsunami caused by a massive earthquake can have detrimental effects on Indian coasts. Therefore, India will be able to serve not only the interests of the littoral states in the SCS region, but also own as well.¹⁰

The Technique

There are limitations in restricting oneself to earthquake and sea level data for making correct predictions and issuing relevant advisories. While the former can provide data with regard to magnitude, epicentre, etc., it fails to detect the exact energy of a tsunami caused

by an earthquake. A relevant example of this issue would be the tsunami warning that was issued in 1986 for Hawaii, which led to the evacuation of Waikiki. Although the tsunami arrived as predicted, it was in the form of non-flooding waves. The false alarm led to a loss of \$41 million dollars.¹¹ The latter can provide immaculate tsunami wave amplitude but it has proved to be useless for early warning systems. Therefore, it becomes an imperative to ensure that sea level data, measured at the surface of deep ocean areas, is utilised in the making of forecasts.

The most important feature of a tsunami detection buoy is that a real time tsunami wave can be detected by it within 30 minutes of the tsunami being generated by an earthquake. These buoys are usually situated near subduction zones or borders between tectonic plates. The two main functions that a tsunami detection buoy can serve are, firstly, helps in detecting if a tsunami has been generated by an earthquake or not in a span of 15-30 minutes and can also detect the wave that has been generated. Secondly, it improves the accuracy of tsunami detection by using real time wave data.¹²

Since a tsunami occurs with minimal warning and is devastating in nature, the deployment of numerous buoys in tsunami-prone regions enhances the efficacy of the TWS mechanism. There are already a multitude of these buoys in the Pacific Ocean, the Indian Ocean, the Atlantic Ocean and the Caribbean Sea. Their establishment in the SCS will definitely mitigate the risk of tsunamis in these high-risk areas. India can play a leading role in this direction, owing to its experience in advancing the existing alert system in SCS.

Potential Collaborators

According to MS Rajeevan, since India is head of the Regional Integrated Multi-hazard Early Warning System for Asia and Africa (RIMES), if the TWS is established as a part of RIMES, nations like Vietnam, Malaysia and Thailand, which are also its co-members and are vulnerable to tsunamis in the SCS, will definitely stand to benefit.

Implications

According to Jay Batongbacal, Director of the Institute for Maritime Affairs and Law of the Sea at the University of the Philippines, the incentive for China to positively react to India's plans may have been an attempt to display a reduction in its usual aggressive display of territorial claims and maritime policy in relation to the SCS, before the

scheduled meeting of the Chinese Communist Party Congress later in 2017, when President Xi Jinping is expected to seek another term as Chairman.¹³ They have been trying to polish up their image the past year because the coming Congress is important for Xi Jinping's attempt at the consolidation of his power, so it may therefore be an attempt by them to show that their foreign policy has been working. There is a possibility that Beijing may react more harshly once India moves to actually set up the warning system.

The South China Sea States may well have discussed the tsunami warning system with New Delhi before the plan was made public. The Chinese president's reputation at home, and international pressure on Beijing, may also have prompted the consent from China to India. It could be just a temporary reaction to the current problem at hand, with China responding to pressure to work with other countries that claim rights to a vast disputed sea, by voicing support for India's proposed tsunami alert system.

India is not a claimant in the South China Sea, which is prized for its fisheries, fossil fuel reserves and international shipping lanes. But when Vietnam and India's state-owned Oil and Natural Gas Corporation agreed to explore off the Vietnamese coast more than a decade ago, China "strongly objected," said Richard Cronin, a Southeast Asia Program Fellow with The Stimson Center, a think tank in Washington. India's Ministry of Earth Sciences' plans to transfer data to Vietnam, Thailand and Malaysia through the setting up of a TWS in the SCS, to enable the issue of advisories to these nations about any earthquake that might result in devastating tsunamis, which can wipe out entire population in the coastal regions of those states.

China and India have quite a complex relationship. China has always had an opposition to foreign interference in its domestic affairs and also in regional affairs. They have their own territorial disputes along their land borders, and this has been the case for a long time. India and China dispute two border areas. China also frets over India because India has the world's second largest population and is backed by Western powers. The Indian Prime Minister, Narendra Modi, wants a stronger role for his country internationally, particularly in economic matters around Asia. In the 'Look East Policy', he has emphasized the improvement of relations with countries from Southeast Asia.¹⁴

"China's nod to the Indian warning system will likely be a one off", said Jay Batongbacal, hinting that China's behaviour in this instance has been an exception. However, there are other experts who have taken a more positive view of the situation. "It's not an India-specific initiative from what I remember, so given that background we

may not be surprised that the Chinese have not reacted adversely,” says Brahma Chellany, professor of strategic studies at the New Delhi-based Center for Policy Research.¹⁵

Data from one Russian and three US DART buoys provided an accurate forecast of the 2011 Japanese tsunami for US coastlines. This example of sharing of vital data between Russia and the USA is a model for international cooperation. India and China may cordially cooperate with each other in the SCS region by exchanging technological expertise and information and, consequently create a highly efficient TWS that will successfully avert any disaster from affecting threatened regions.

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Notes and References

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² Ibid.

³ Prasanth Parameswaran, “What’s Behind China’s ‘New’ South China Sea Tsunami Warning Center?”, The Diplomat, March 16, 2016.

⁴ Adam Switzer, Shireen Federico, “Tsunami Hazard in South China Sea is Likely Greater than Previously Thought”, Earth Observatory of Singapore News, October 19, 2016.

⁵ During the earthquake, the fault slip between the two tectonic plates is assumed to be uniform in the uniform slip distribution technique.

⁶ The slip on each sub fault is studied separately.

⁷ Press Information Bureau, “Indian Tsunami Early Warning Centre”, Ministry of Earth Sciences, <http://pib.nic.in/newsite/PrintRelease.aspx?relid=90534> (accessed July 29, 2017).

⁸ Ibid.

⁹ Linlin, Li, Adam D. Switzer, Chung-Han Chan, Yu Wang, Robert Weiss, and Qiang Qiu. 2016. How heterogeneous coseismic slip affects regional probabilistic tsunami hazard assessment: A case study in the

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¹⁰ Supra Note 7.

¹¹ Bernad, Eddie, and Vasily Titov. 2015. Evolution of Tsunami Warning Systems and Products. *Philosophical Transactions of the Royal Society A – Mathematical, Physical and Engineering Sciences*, 373, no. 2053 (September 21), <http://rsta.royalsocietypublishing.org/content/373/2053/20140371#xref-ref-11-1> (accessed July 23, 2017).

¹² Zhao, Lianda, Fujiang Yu, Jingming Hou, Peitao Wang, and Tingting Fan. 2013. The Role of Tsunami Buoy Played in Tsunami Warning and its Application in South China Sea. *Theoretical and Applied Mechanics Letters*, 3, no. 3 (May 10), http://ac.els-cdn.com/S2095034915302348/1-s2.0-S2095034915302348-main.pdf?_tid=20f7d730-7487-11e7-8c00-00000aacb35e&acdnat=1501351119_bc3a529712bf5214d7963d23c8boeb20 (accessed July 25, 2017).

¹³ Jennings, Ralph. “China, Normally Protective of a Disputed Sea, Gives India a Rare Nod.” *VOA News*, June 16, 2017.

¹⁴ Press Trust of India. “‘Look East Policy’ now turned into ‘Act East Policy’: Modi”, *The Hindu*, November 13, 2014, National Section.

¹⁵ The tsunami warning system, if built by India, will mainly serve the interests of the countries in SCS region.