

Tsunami and Elephant “Sixth Sense” in Sri Lanka

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Introduction

Soon after the Asian tsunami on the 26th of December 2004, there were many reports in the local and international press of how people had observed animals reacting in strange ways, in Sri Lanka and other locations thousands of km away from the epicenter, weeks to hours before the tsunami struck:

- <http://www.sciencenewsforkids.org/articles/20050413/Feature1.asp>
- http://news.nationalgeographic.com/news/2005/01/0104_050104_tsunami_animals.html
- http://news.bbc.co.uk/2/hi/south_asia/4136485.stm
- <http://www.reuters.com/newsArticle.jhtml?type=scienceNews&storyID=7207207>
- <http://www.dawn.com/2005/01/10/int8.htm>
- Sheldrake (2005)

These reports suggested the possession of a ‘sixth sense’ by animals both domestic and wild, which warned them of the impending tsunami and allowed them to take appropriate action to escape it. Elephants featured prominently in these claims with stories of elephants in Sri Lanka and Thailand having saved tourists (Sheldrake 2005). The ability of elephants to detect seismic vibrations and low frequency sounds was thought to provide support for such responses. A person in Yala National Park related how he observed herds of elephants running away in terror from the coastal area half an hour before the tsunami struck. A game guard in Yala related the story of how house sparrows in Okanda on the Eastern coast, had suddenly abandoned their nests two weeks before the tsunami, and that the house where the nests was destroyed by the tsunami. A party of visitors to Yala who were at the Buttawa bungalow on the coast claimed that on the morning of the tsunami, a herd of spotted deer had climbed up the sand dune behind the bungalow and were gazing out at the sea around an hour before the tsunami

struck. They were so transfixed that they did not even take any notice of the humans around. Another stated, that a person took his dogs for walks on the beach every morning, but on the fateful day, the dogs flatly refused to go out, thus saving his life. An observation that no dead animals were found in the Yala National Park soon after the tsunami similarly added credence to the ‘sixth sense’ story, suggesting that such pre-warning enabled them to save their lives. However, these stories when checked out proved to be either fabrications or the drawing of unjustified association between cursory observations and the tsunami.

The radio collared elephants

An unbiased observation of animal movement before and during the tsunami was that of two radio collared elephants we were tracking in the Yala National Park, South-east Sri Lanka (Wikramanayake *et al.* 2006). The two animals were fitted with GPS-satellite collars that remotely collected a GPS position every 4 hours. The recorded positions were transmitted to an overpass satellite that relayed the data back to us. Elephants have a sexually dimorphic social organization with females and young in herds and adult males being solitary. Both the collared animals we were tracking were herd animals, one a juvenile male ‘Kavan’ and the other an adult female ‘Biso-Menike’, hence their movements represented that of the whole herd. Both the herds numbered around 30 animals each, although the number of animals that were closely associated together at any given time varied from about four individuals, up to the full herd. As a response to an event such as a tsunami would be uniform at least across all members of a herd, the movements of the two tracked animals can be taken to represent the two herds at the least.

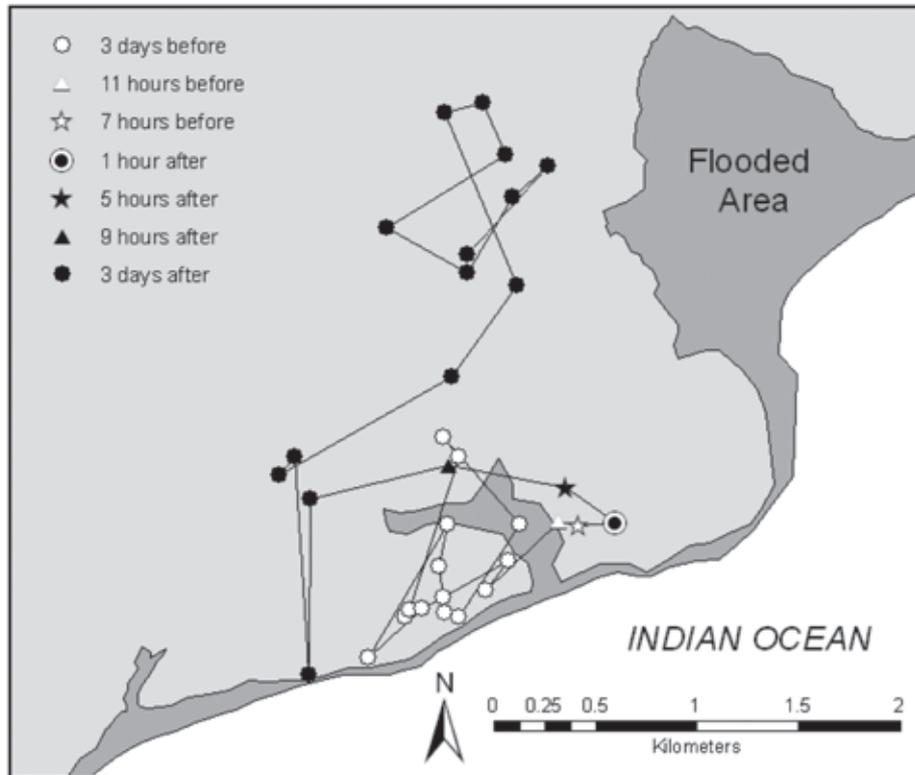


Figure 1. Map showing Bisu-Menike’s locations in the week of the tsunami (23rd - 29th Dec. 2004).

Analysis of the two tracked elephants’ ranging patterns showed there were no abnormal movements that indicated any response to the tsunami prior to its occurrence. On the days prior to the tsunami, Bisu-Menike and her herd were ranging in the coastal area close to Buttawa and Uraniya (Fig. 1). Bisu-Menike was only about 200 m from the sea at the time of the tsunami impact and even continued to range in the same area afterwards (Fig. 1). Her position at the time of the tsunami impact was close to the Uraniya lagoon, through which the tsunami incurred onto the land. The tsunami wave would have passed only a few meters away from where she and the rest of her herd were at the time. Kavan and his herd were ranging about 5-6 km inland from the coast and also did not show any response (Fig. 2). While Kavan’s group was beyond the area inundated by the tsunami, a distance of 6 km from the coast would be insignificant if animals perceived, and were responding to the tsunami’s genesis occurring over 1500 km away, or its approach through the ocean at hundreds of km per hour. Hence both animals

and the associated herds could be expected to show the same response if indeed they were pre-warned of the tsunami.

Thus the only unbiased animal data disproves prior detection and response of animals to the tsunami. For more details see Wikramanayake *et al.* 2006.

It is interesting to analyze the possible mechanisms of a response by animals to an impending tsunami, through a scientific point of view. If animals did responded to the tsunami any time prior to its impact, they had to either perceive its genesis or approach and then respond to it in a meaningful way, i.e. flee inland from the coastal area. This could happen if either the detected event was a disturbance of sufficient magnitude to elicit a general non-specific response or if the animal identified it as a particular cue and consciously or instinctively associated it with the coming of a tsunami.

A general response to disturbance

The 2004 Asian tsunami was generated by a massive sub oceanic earthquake. Therefore it is possible that animals in Sri Lanka perceived a seismic signal at its genesis. However, if they responded to the seismic signal of the earthquake, every time an earthquake occurs, irrespective of whether it was sub-oceanic and would generate a tsunami or inland and not generate a tsunami, animals should flee in the opposite direction. Since Sri Lanka is an island, a strong nonspecific general response to disturbance would predict that animals on the western side should run to the coast, as the disturbance would be from the east. However, since the epicenter of the earthquake that gave rise to the tsunami was over 1500 km away from Sri Lanka, any seismic signal perceived would have been of very small magnitude. Even if detected, the disturbance would be very minor. Animals would not respond to such a minor signal with a non-specific fleeing response, as one of equal or greater magnitude would be generated by a very much smaller tremor that occurred at a lesser distance, or any number of other events such as something impacting the ground, an explosion, or even a thunder clap.

The approaching tsunami while it was travelling through the deep ocean would not provide a sufficient disturbance to elicit a non-specific response as the tsunami is just another wave, only a meter or so in height in mid ocean. Therefore, it is unlikely that animals could have perceived the earthquake or the tsunami any significant time before its impact, or if they did, would have responded to it as a non-specific general response to disturbance, other than maybe to prick up their ears.

A specific response

Recognition of the disturbance as an event that portends a tsunami suggests that animals associated the detected disturbance, however minor, with the subsequent arrival of a tsunami. Such association would have to be through personal experience or through 'instinct'.

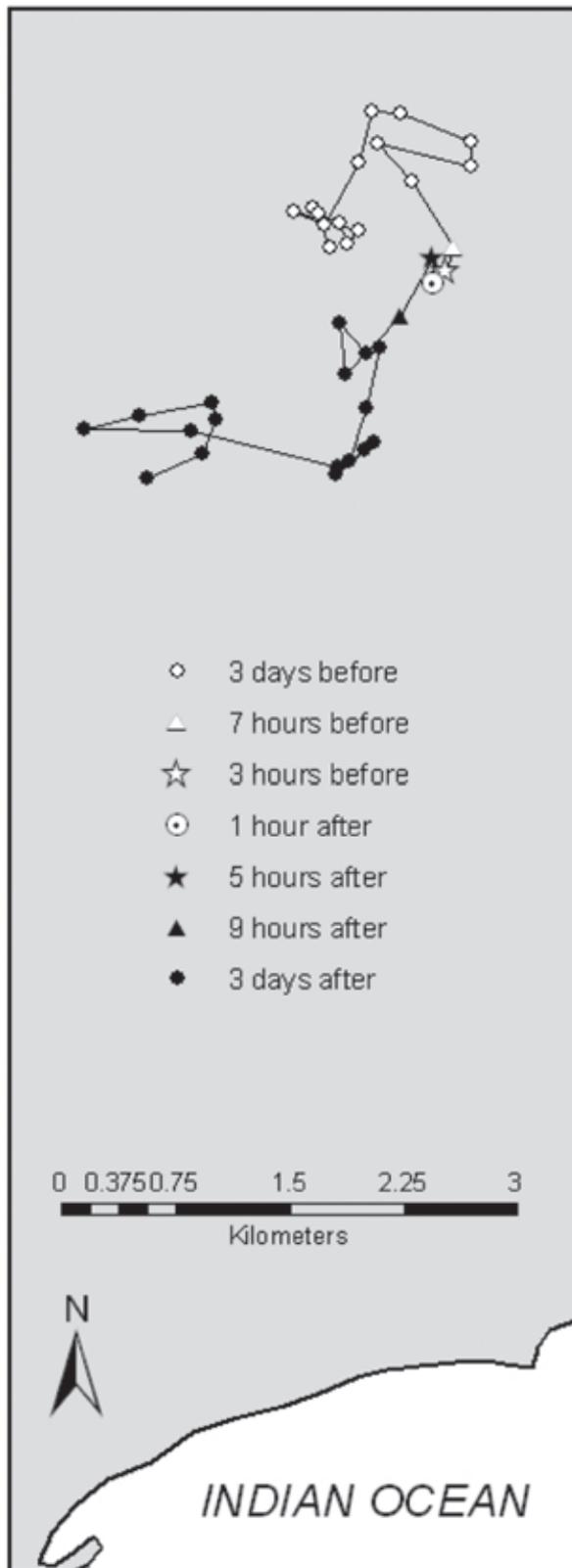


Figure 2. Map showing Kavan's locations in the week of the tsunami (23. to 29. Dec. 2004).

Response based on previous personal experience by individual animals is not possible in Sri Lanka, as when compared to the lifetime of animals, tsunamis occur extremely rarely in this part of the world. Consequently, no animal living in Sri Lanka at the time of the tsunami could have previously experienced such an event. In fact the enormous human death toll bears stark evidence to the rarity of tsunamis. Tsunamis did not feature in the collective human consciousness in this part of the world, even though we have a collective ‘memory’ that goes back thousands of years through our written records. A possible reference to a tsunami in ancient Sri Lankan literature is that of the story of the ‘sea coming ashore’, in Kelaniya (western coast) during the reign of king Kelanitissa many centuries ago. The only other recorded tsunami event in recent history was the one generated by the cataclysmic explosion of Krakatoa in 1883, which took the life of a single person in Hambantota on the south-eastern coast (Winchester 2003). Thus, for any animal to have responded to the tsunami of 2004 through personal experience, it had to be well over 121 years old.

Could the reaction to the perceived cue be instinctive, or genetically inherited? Many behaviors have genetic components. However, for any behavior to have a genetic component or be ‘inherited’, it needs to be selected for. Such selection could occur if it impacted an entire population or a fragment of the population frequently. Now when a tsunami occurs, if the animals that ran away by detecting the tsunami were the only ones of the species that survived the tsunami, then the tsunami would exert a strong selective pressure on the ability of animals to detect it and run away in time. If so, even if a tsunami happened every few thousand years or generations, only the ones that would run away would survive from the whole species every time. Therefore a tsunami would exert a strong selective force and would select for animals that have such a ‘tsunami sense’. On the other hand, if the tsunami impacted only a fragment of the species or population, the animals that ran away would survive, but so would a large number of individuals that did not run away but were beyond the reach of the tsunami. In re-

colonizing the area impacted by the tsunami, the ones that ran away would have to compete with the ones that did not show that behavior but survived because they were out of reach of the tsunami. If tsunamis occurred very frequently, each time it would select the ones that ran away. Hence depending on the area and frequency of impact, over a period of time tsunamis could again select for that behavior.

However, if tsunamis impacted only a small fragment of the population *and* occurred very rarely, which is the case in relation to Sri Lanka, the selective force would be so small that it would have no effect.

Extensive surveys conducted by us (Fernando *et al.* 2006) showed that the tsunami impact was very localized and patchy. The extent of the tsunami impact on land, in relation to the species distribution of most terrestrial fauna, especially in relation to groups such as mammals, was minute. Therefore, tsunamis do not have an impact on most animals, of an intensity, extent, or frequency, required to exert a selective pressure. In essence, tsunami impact on terrestrial fauna is that of a low magnitude rare event, hence of little evolutionary potential for selection of a behavioral response such as running away in response to its pre-detection.

Animal deaths in the tsunami

Our surveys also showed that a number of animals that did perish from the tsunami included buffalo, wild boar, hare, a python etc. (Fernando *et al.* 2006). While the numbers were very small when compared to the massive human toll, it can be explained without invoking sixth senses or instincts. Firstly, the number of animals and especially large mammals, in the coastal area at any point in time is insignificant compared to the number of humans in similar areas, a comparison of just a few animals to millions of people. The highest threat from the tsunami was to those that were on the beach at tsunami impact. However, unlike humans, one very rarely finds any large animals on the beach itself, especially during daytime. For example, seeing an elephant on the beach is an exceedingly rare sight. Therefore, the possibility of a large

animal getting caught in a tsunami is very remote.

The tsunami impact was very patchy and incursion of the tsunami occurred mainly through breaks in the coastal sand dunes such as lagoon and river outlets and low-lying areas. Therefore, even animals that were in the coastal zone but just outside the area of incursion were perfectly safe, as was the case with Biso-Menike. In contrast to its approach through the ocean, the tsunami wave impacting the shore and advancing through the lagoons and fringe forests would create an enormous disturbance and every animal would instantly react to it and try to get out of the way. As most animals depend on their speed and reactions to escape from hunters or to hunt themselves, practically any wild animal would respond to such an event far better than any human could. Therefore, even if everything else was equal, fewer animals would be caught in a tsunami than humans.

References

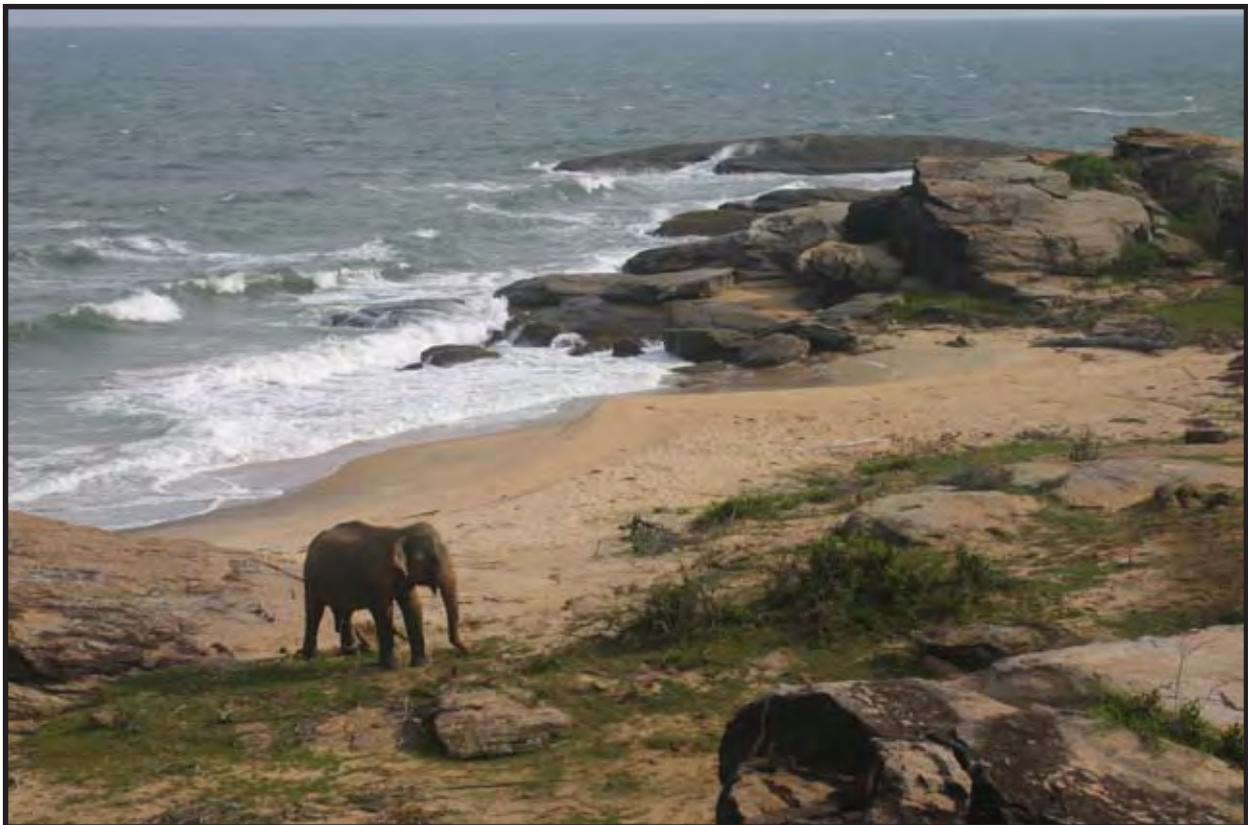
Fernando, P., Wikramanayake, E.D. & Pasto-rini, J. (2006) Impact of the tsunami on terrestrial ecosystems of Yala National Park, Sri Lanka. *Current Science* **90**: 1531-1534.

Sheldrake, R. (2005) Listen to the animals. *The Ecologist* **35** (2): 18-20.

Wikramanayake, E., Fernando, P. & Leim-gruber, P. (2006) Behavioral response of satellite-collared elephants to the tsunami in Southern Sri Lanka. *Biotropica* **38**: 775-777.

Winchester, S. (2003) *Krakatoa*. Harper Collins, New York, USA.

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A rare sight - elephant on the beach in Yala National Park, Sri Lanka
Photo by Jennifer Pastorini