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Invisible tsunami deposits – the Misawa example, Japan

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With at least three reported waves, the 2011 Tohoku-oki tsunami's destructive force caused massive damage along the Aomori coastline in northern Japan. At Misawa the coastal area was inundated up to 550 m inland and sandy sediment remnants can be traced to c. 350 m (c. 61-63% of the maximum inundation) from the shoreline.

The discovery of a floatable plastic object within a previously inconspicuous woody and organic layer in connection to our analytical data lead to the detection of a yet undocumented 'invisible' tsunami deposit. This layer is first appearing on top of the sandy deposit but then reaching even further inland (approx. 69-72% of the max. inundation). Initially the organic and woody layer was not evident during early stages of the field work and this would have been unchanged without the discovery of the floatable plastic particle embedded within the deposit. That critical observation was the turning point for the interpretation of the layer's origin and thus our understanding of processes during the Tohoku-oki tsunami at the Aomori coast near Misawa harbor. Overall, may the first recognition of this woody-organic and up to now 'invisible' layer lead to an improvement in the understanding of tsunami processes and their sedimentological characteristics. Further, may the knowledge obtained from these types of deposits be transferred to and improve paleo-tsunami investigations, especially in rural natural environments, as sand sheets of historic and paleo-tsunamis represent minimum estimates for the coastal inundation and potential underestimations may be reduced by addressing the 'invisible' fraction of a tsunami's inundation.