# Geological survey results at Sendai Plain, Japan after the 2011 Tohoku-oki tsunami



Kazuhisa Goto (Chiba Institute of Technology)

# Field survey at the Sendai Plain



After early April 2011, we conducted field survey at 9 transects in the Sendai Plain. Total pits studied were over 300.

#### Tsunami deposit close to the inundation limit



Photo by S. Fujino

Sand layer of <1 mm was deposited below the mud deposits. Sand deposits thinner than 0.5 cm is very difficult to identify in the geologic record and such thin layer may not be recognizable (or not preserved).

#### Sediment source and beach recovery



#### **Terrestrial sediment source (liquefaction)**



In case of the near-field tsunami with strong ground shaking, effect of the liquefaction and consequent supply of the vast volume of sand from vented sediments should be taken into account as an important source of the tsunami deposits.

## Was liquefaction an important source of tsunami deposits?



Second peak of the thickness is consistent with the liquefaction zone.



### Comparison to the Jogan tsunami deposit: thickness distribution



Thickness distribution is well consistent with that of the AD869 Jogan tsunami

#### Inundation distance v.s. inland extent of the sand



• It is not consistent with the inundation distance when it is over 2.5 km.

Tsunami deposit (>0.5cm) distributes <3 km from the shoreline => similar to Jogan?
why inland extent of the sand deposit (>0.5 cm) corresponds to the inundation distance irrespective of the tsunami events if the inundation distance was <2.5 km?</li>

#### **Summary and questions**

- Distribution of the 2011 tsunami deposits (>0.5 cm) do not consistent with the inundation distance when the inundation distances were more than 2.5 km.
   => Can we estimate the inundation distance simply from the sand deposits?
- 2. Sand from the liquefaction may be the important source of the tsunami deposits.
   => Can we differentiate sand from the beach/offshore and liquefaction in the tsunami deposits?
- 3. Sedimentary features (thickness, grain size, and components) and sediment distribution area of the 2011 tsunami deposits are remarkably similar to those of the AD869 Jogan tsunami.

=> It would be the best example to test the validity of the paleo-tsunami research. Why were Jogan tsunami studies not included in the disaster prevention plan? We have to think again the social relevance.



<u>Acknowledgement</u>: This research was supported by a research grant from Tohoku University for an emergency field survey following the 2011 Tohoku-oki tsunami (leader: F. Imamura). I thank to D. Sugawara, Y. Nishimura, S. Fujino, T. Abe, T. Haraguchi, M. Yamada, C. Chagué-Goff, J. Goff, B. Jaffe, B. Richmond, W. Szczucinski, D. R. Tappin, R. Witter, E. Yulianto.