UBIQUITOUS MONITORING OF SOIL WATER AND SALT CONTENT IN PADDY FIELDS DAMAGED BY TSUNAMI IN JAPAN

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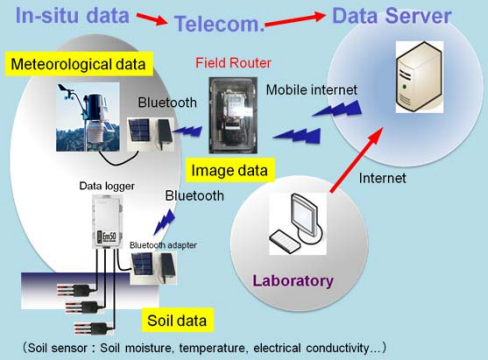
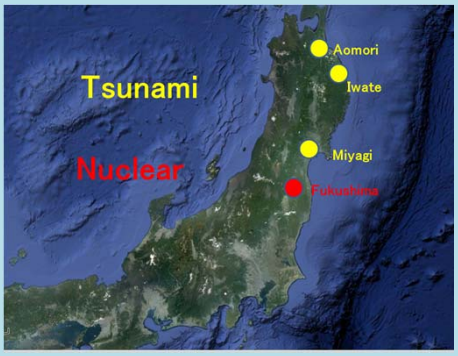
Abstract

The damage caused by the massive earthquake and resulting tsunami that struck Japan on March 11, 2011 was particularly severe in Miyagi, Iwate, and Aomori Prefectures, where numerous coastal embankments were broken and large areas of farmland, including paddy fields, were flooded with sea water. In Miyagi Prefecture, the farmland about 15,000ha was damaged by the sea water and is waiting for recovering by desalinization. In order to remove salt from farmland, the underdrain technique would be effective. We have compared the movements of water and salt in soil at the paddy field in three Prefectures. As a result of comparison between Natori where we can use the underdrain, and Iwanuma where we cannot use the underdrain, it was found that salt was removed out of the field by rainfall in Natori and that salt remained in the filed in Iwanuma although both EC_w (Electrical conductivity of soil water) and θ (Volumetric water content) increased at the depths of 25cm and 35cm. This result means that improvement and utilization of underdrain are important for restoration of salt damaged farmland.

***Key words**: Soil Sensor, Desalinization, Tsunami Monitoring*

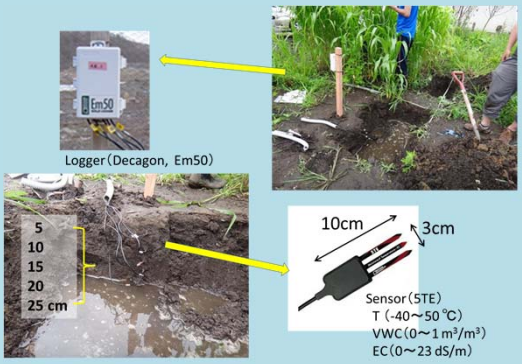


Field monitoring system (FMS)

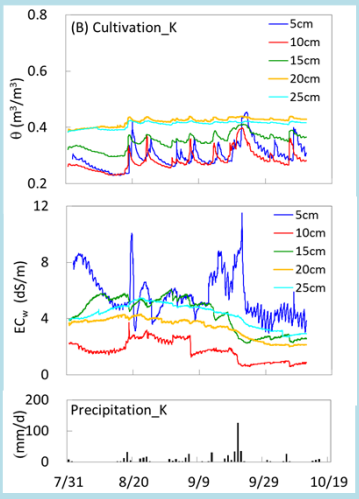


Monitoring sites

Tsunami-hit farmland



Monitoring of soil during desalinization process



Change in $\boldsymbol{\theta}$ and $\boldsymbol{EC_w}$ in soil

Desalinization by draining irrigation water discharge from underdrain (Feb 7, 2012)

Conclusions

1. The FMS is useful for monitoring the restoration process of paddy fields damaged by tsunami.
2. Improvement and utilization of underdrain are important for restoration of salt-damaged farmland.

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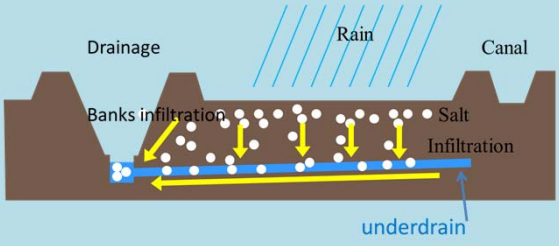
Real-time monitoring of paddy field
http://www.iai.ga.a.u-tokyo.ac.jp/mizo/edrp/



The mechanism of underdrain technique