
[EJ] Evening Poster | H (Human Geosciences) | H-TT Technology & Techniques

[H-TT16]Environmental Remote Sensing

convener:Hiroto Shimazaki(National Institute of Technology, Kisarazu College), Akihiko Kondoh(Center for Environmental Remote Sensing, Chiba University), HASEGAWA Hitoshi(国土舘大学, 共同), Teppei Ishiuchi(Miyagi University)

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Measuring environmental changes at various spatio-temporal scales is the key to improve our understanding of the relationship between human activities and environmental problems. Remote sensing is a powerful tool to acquire information on the earth's surface frequently and repeatedly over a broad spatial scale, enabling us to find the changes which might be related to the cause and consequence of environmental degradation. This session discusses the applications of remote sensing to the detection and monitoring of environmental changes in time and space, and aims to promote the knowledge-sharing for better management of the environmental problems and natural disaster in any place in the world.

[HTT16-P05]Correlation analysis between salmon farming and red tide distributions in inland sea of Chiloe Island, Chile mapped out by remote sensing

*Sakura Yoshino¹, Ryohei Yamashita¹, Kaisei Nagao¹, Kuriki Murahashi², Ali Roshanianafard³, Hiroshi Kawamata¹, Nobuyasu Naruse^{1,4,5}, Yukihiro Takahashi^{1,6} (1.Global Science Campus, Hokkaido University, 2.Graduate School of Science, Hokkaido University, 3.Graduate School of Agriculture, Hokkaido University, 4.Institute for the Advancement of Higher Education, Hokkaido University, 5.Shiga University of Medical Science, 6.Faculty of Science, Hokkaido University)

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Fish farming is one of the growing industry in Chile for several decades, nowadays occupying the second production of salmon in the world behind Norway. The red tide in coastal areas often accompanies the salmon fishkill resulting in ~20 % (100 million kg) of its production in 2016, which is the big issue to be solved.

Red tide is well-known to be triggered directly by marine phytoplankton blooming and indirectly by rising temperature on sea surface and eutrophication through human activities. In the report, Harmful Algal Blooms Assessing Chile's Historic HAB Events of 2016, Anderson and coworkers pointed out four possible sources of nutrient salt in the inland sea of Chiloe Island, Chile: salmon farming, living drainage from coastal cities, seafood factory effluent, and rivers lying downstream of a fiord. However, their contribution to red tide in the sea is still open questions.

To shed light on the questions we investigated the time/space distributions of red tide in Chiloe inland sea in 2013-2017 by satellite remote-sensing and analyzed the correlation between statistics above and these frequency/distributions.

Observed satellite images with Terra and Aqua map out monthly averaged concentrations of chlorophyll A after the post-processing on NASA worldview, the area or frequency above the threshold concentration identified as red tide. The adopted statistics is as followings: monthly yield of salmon from SalmonChile (The Salmon Industry Association A. G) and annual population of coastal cities found in National Statistics Institute of Chile, which is roughly proportional to living drainage without removal processing

for nutrient salt.

The good correlation between monthly salmon production and frequency of red tide is exemplified (correlation factor 0.64). Both affect each other. Salmon fishkill is caused by hypoxia, lack of dissolved oxygen (DO), due to red tide, whereas eutrophication with much feed in salmon farm and discarded carcass in coastal areas leads to increase the frequency of red tide. Our result indicates the latter mechanism works predominantly than the former in Chiloé inland sea. The detail analysis and results will be displayed in the presentation.

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