KAZUO OKI LAB.

[Global Monitoring for Ecology and Environment, and its applications]

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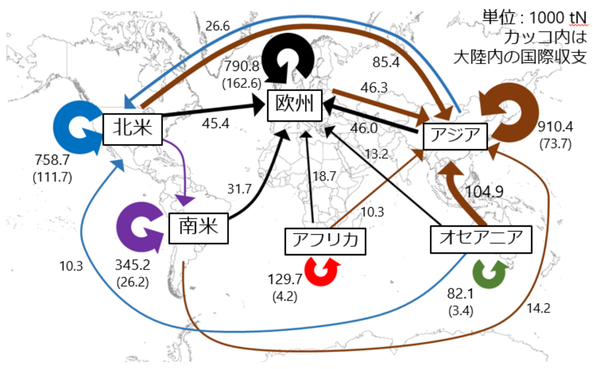
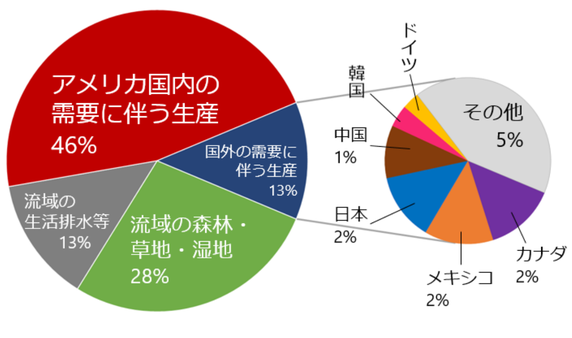
http://hydro.iis.u-tokyo.ac.jp/indexJ.html

Assessment of Nitrogen Footprints

Nitrogen causes variable environmental problems such as an eutrophication in coastal area. Therefore it is important to grasp a movement of nitrogen. In this study, we established the framework which calculates nitrogen footprints made from the real nitrogen outflow for the river. As a result, the contribution from other areas to the environmental pollution at the specific river was elucidated.



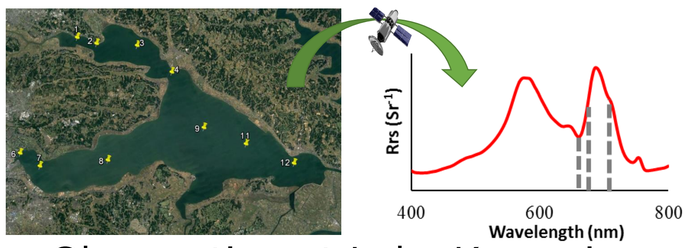
Intercontinental Nitrogen Footprints



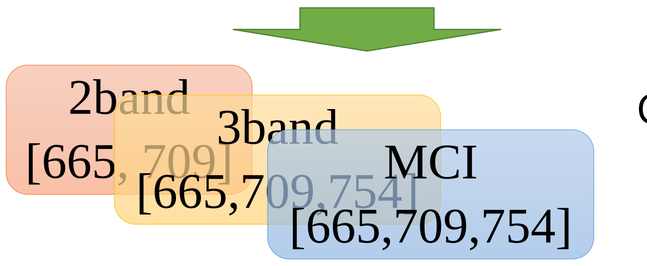
Nitrogen Outflow for Each Rier (e.g. Mississippi River)

A new monitoring technique of water quality

Lake water contains 90% of the global liquid freshwater. To monitor the water quality in lake, chlorophyll-a concentration can be estimated from satellite remote sensing. Existing various techniques have their merits and demerits. So we reassessed them for the same lake. Moreover, we proposed a new estimation technique which combined their merits.

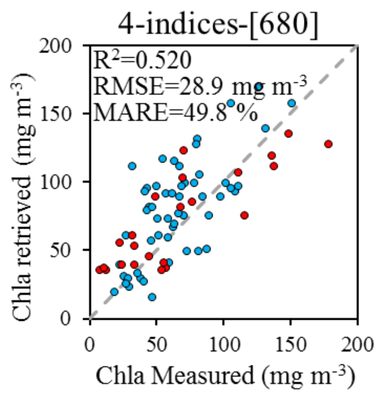


Observation at Lake Kasumigaura



Various estimation indices

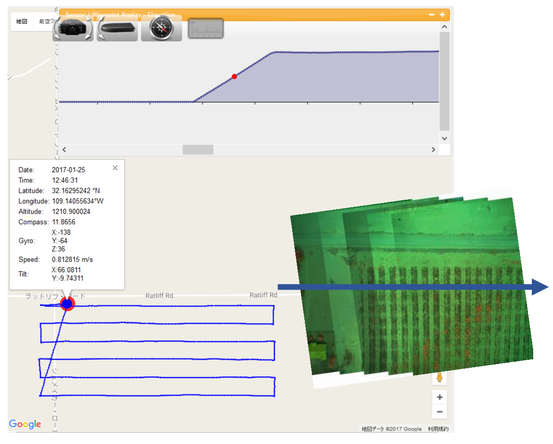
Combi-nation



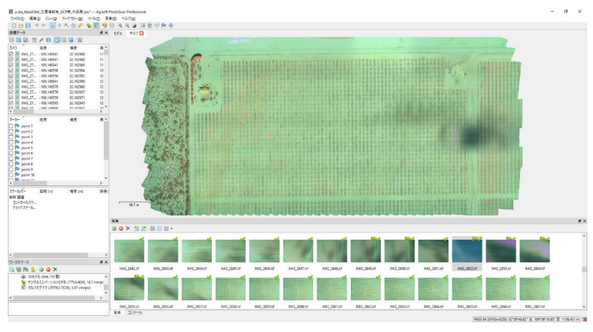
Estimation vs Measurement

Precision Agriculture with UAV

The agriculture which performed with detailed observation and control is called Precision Agriculture. It can improve the quality of crops to increase the yield. By recent rise of UAV, it came to be able to acquire specific data extensively. In this study, we estimate the soil moisture content and monitor growth at pecan orchards in the U.S.



Acquire the positional information with images

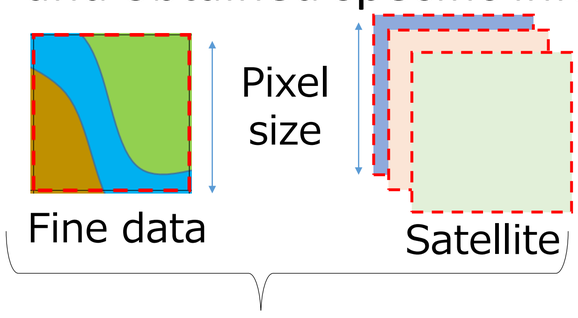


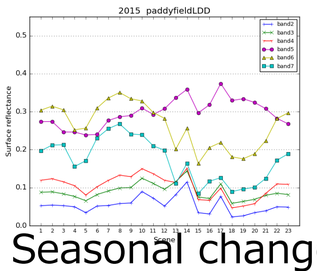
Mosaic image of half orchard(4cm/pix)

Land use classification with unmixing method

Though land analysis by using satellite images has been conducted widely, the coarse pixel size is a challenging problem. Unmixing method can extract mixed information in one pixel separately.

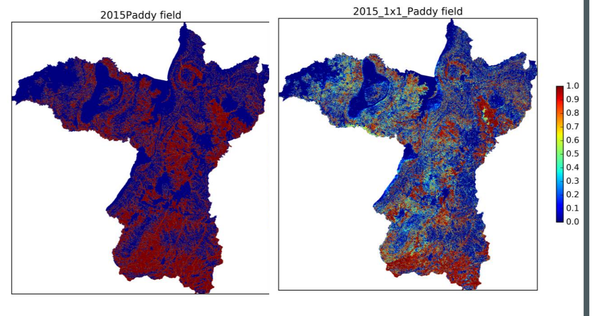
We applied this method for land use classification, and obtained specific information .





Seasonal change of ref.

Apply



Area ratio (Paddy)
(L : Answer, R : Estimation)