



IGU-LUCC FEBRAS & PGI Conf. 090908

The Amur-Okhotsk system or The “Giant” Fish-Breeding Forest connected by dissolved iron

**Takayuki Shiraiwa (RIHN, Kyoto, Japan)
and
Project Members**

Special thanks to:

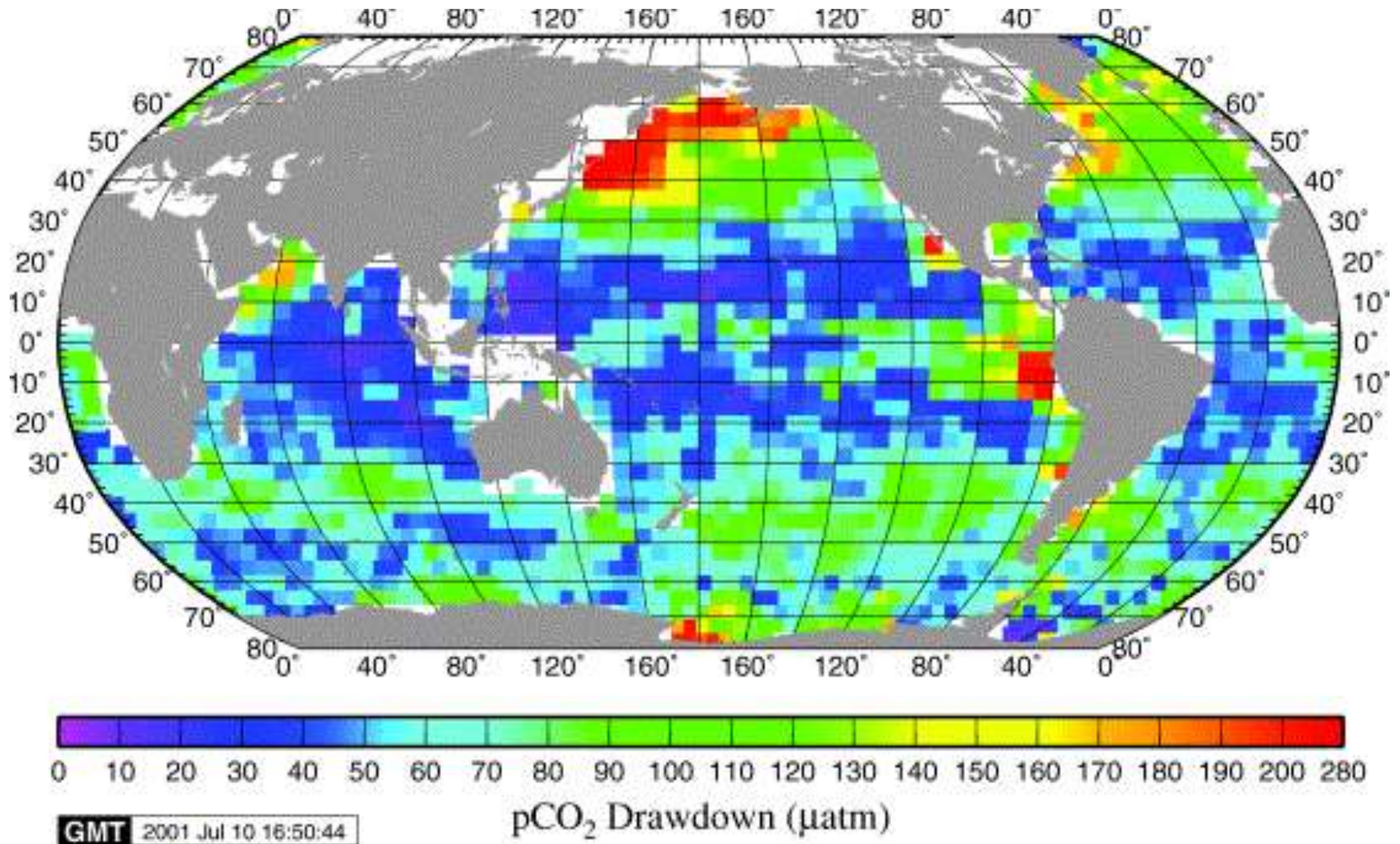
Pacific Institute of Geography, FEBRAS

Institute of Water and Ecological Problems, FEBRAS

Northeast Institute of Geography and Agricultural Ecology, CAS

Institute of Applied Ecology, CAS

The world richest ocean

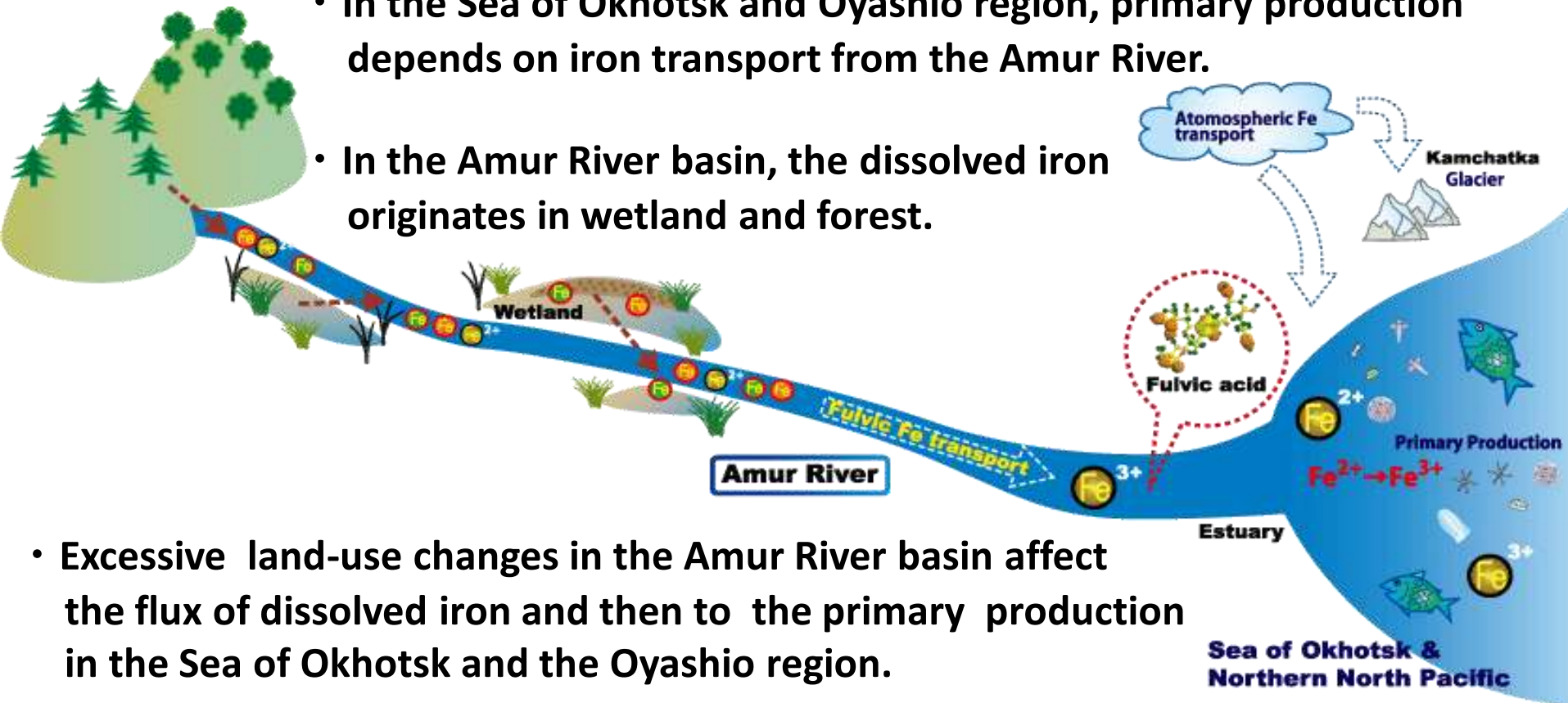


Takahashi et al., 2002

Giant Fish-Breeding Forest hypothesis

-Ecological linkage between the continent and open waters-

- In the Sea of Okhotsk and Oyashio region, primary production depends on iron transport from the Amur River.
- In the Amur River basin, the dissolved iron originates in wetland and forest.



- Excessive land-use changes in the Amur River basin affect the flux of dissolved iron and then to the primary production in the Sea of Okhotsk and the Oyashio region.
- International cooperative effort on conservation on the GFBF is necessary for the sustainability of marine ecosystem in the Sea of Okhotsk and Oyashio open water.

**On behalf of all of the living creatures
in the Sea of Okhotsk and Oyashio open waters.....**

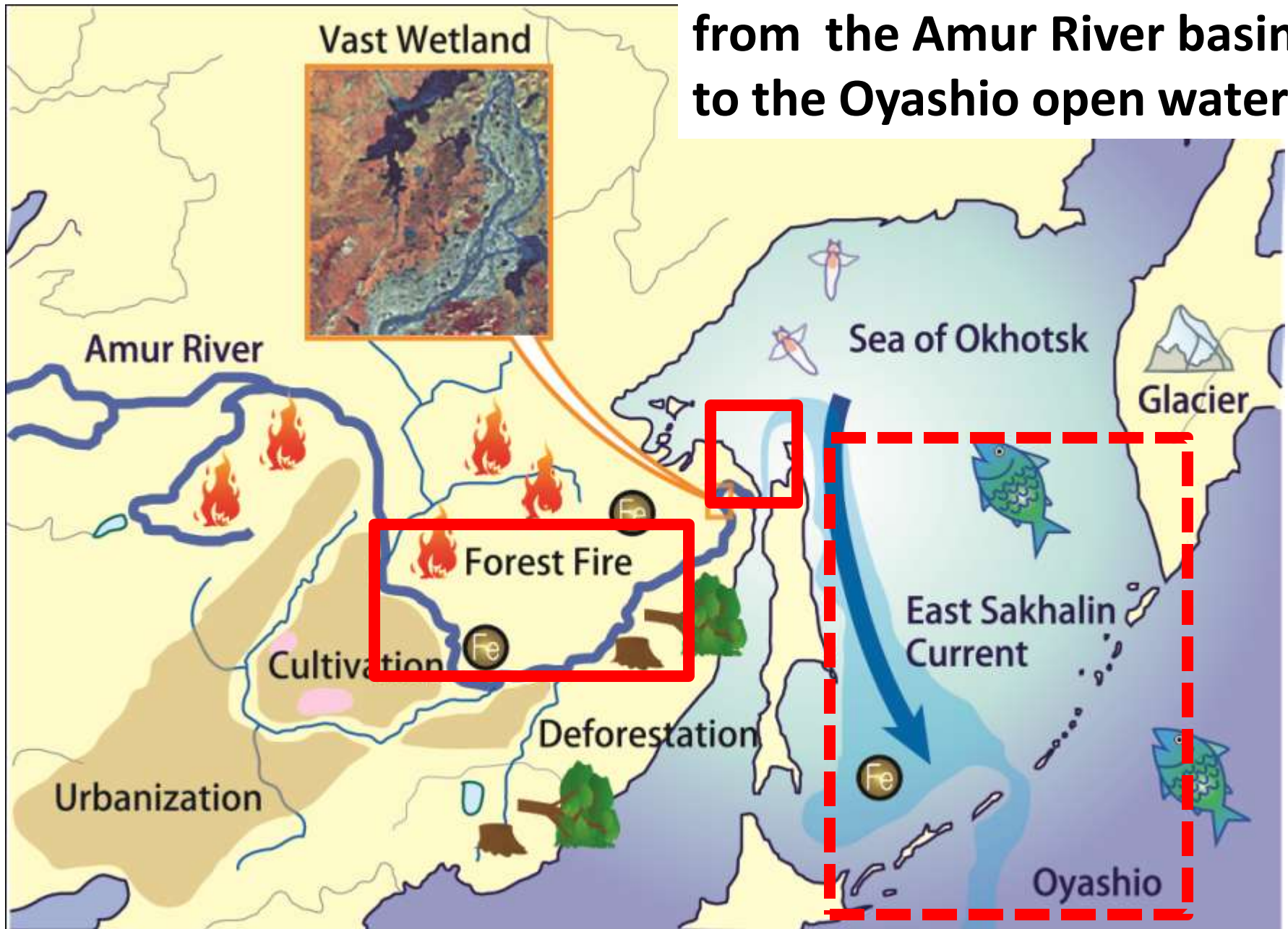
オホーツク・アムール

Okhotsk-Amur

Contents

1. Does dissolved iron from the Amur River basin support the primary productivity in the Sea of Okhotsk and Oyashio region ?
2. Was (Is) there any influence of land-use changes in the Amur River basin on the flux of dissolved iron (and the primary production) ?
3. Proposed strategy for the conservation of GFBB and the ecosystem in the open waters.

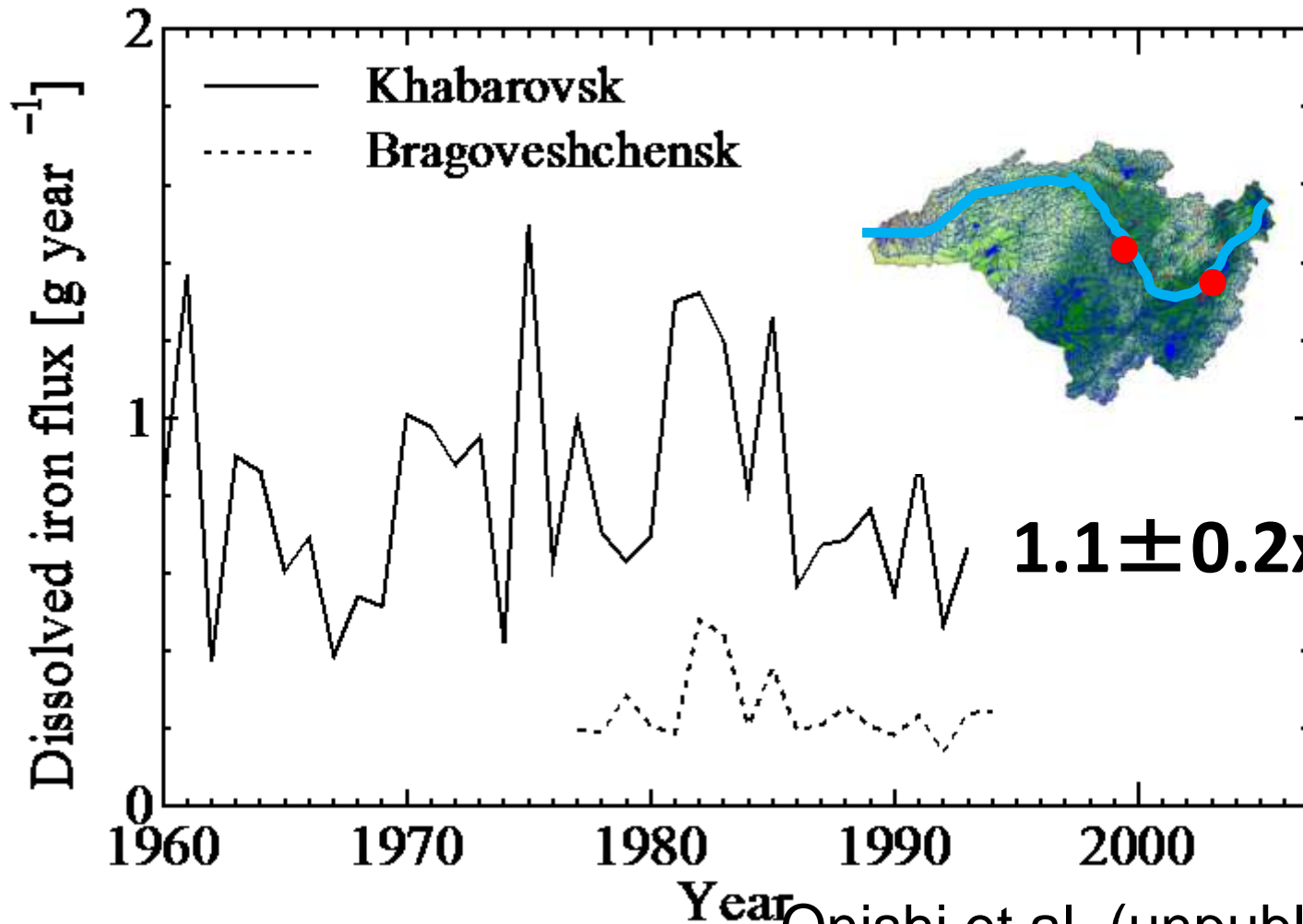
**Transport of dissolved iron
from the Amur River basin
to the Oyashio open water**



Transport of the dissolved iron

1. From the Amur river basin to the mouth

$[\times 10^{11}]$



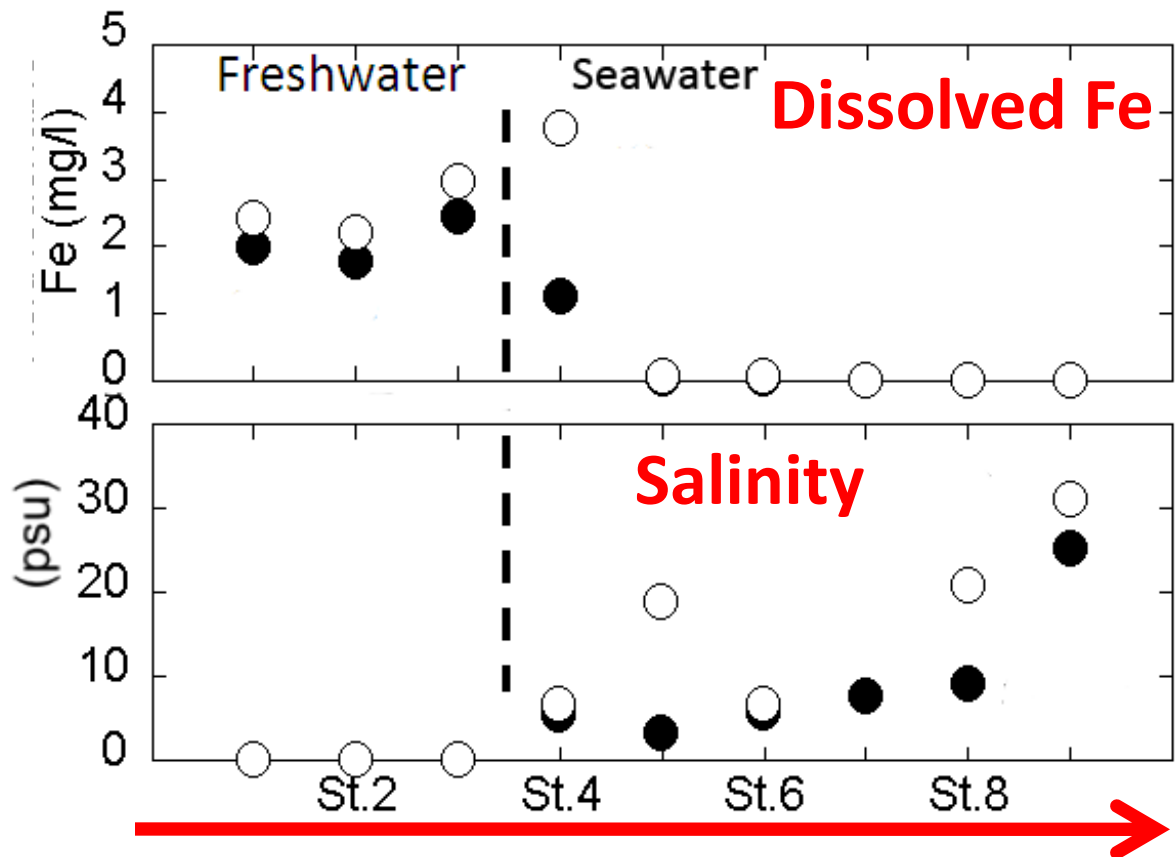
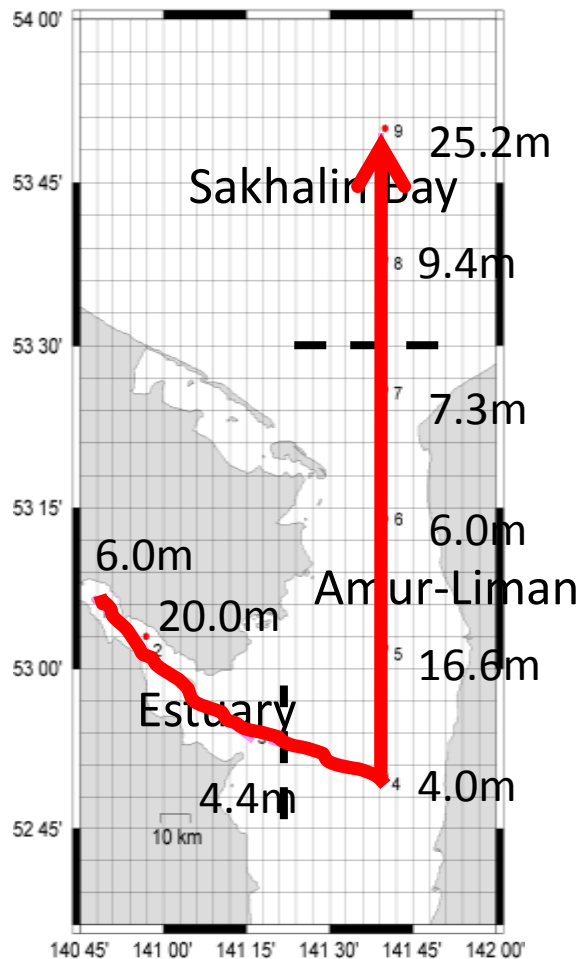
$1.1 \pm 0.2 \times 10^{11} \text{ g/yr}$

Onishi et al. (unpublished)

Data source: ROSHYDROMET

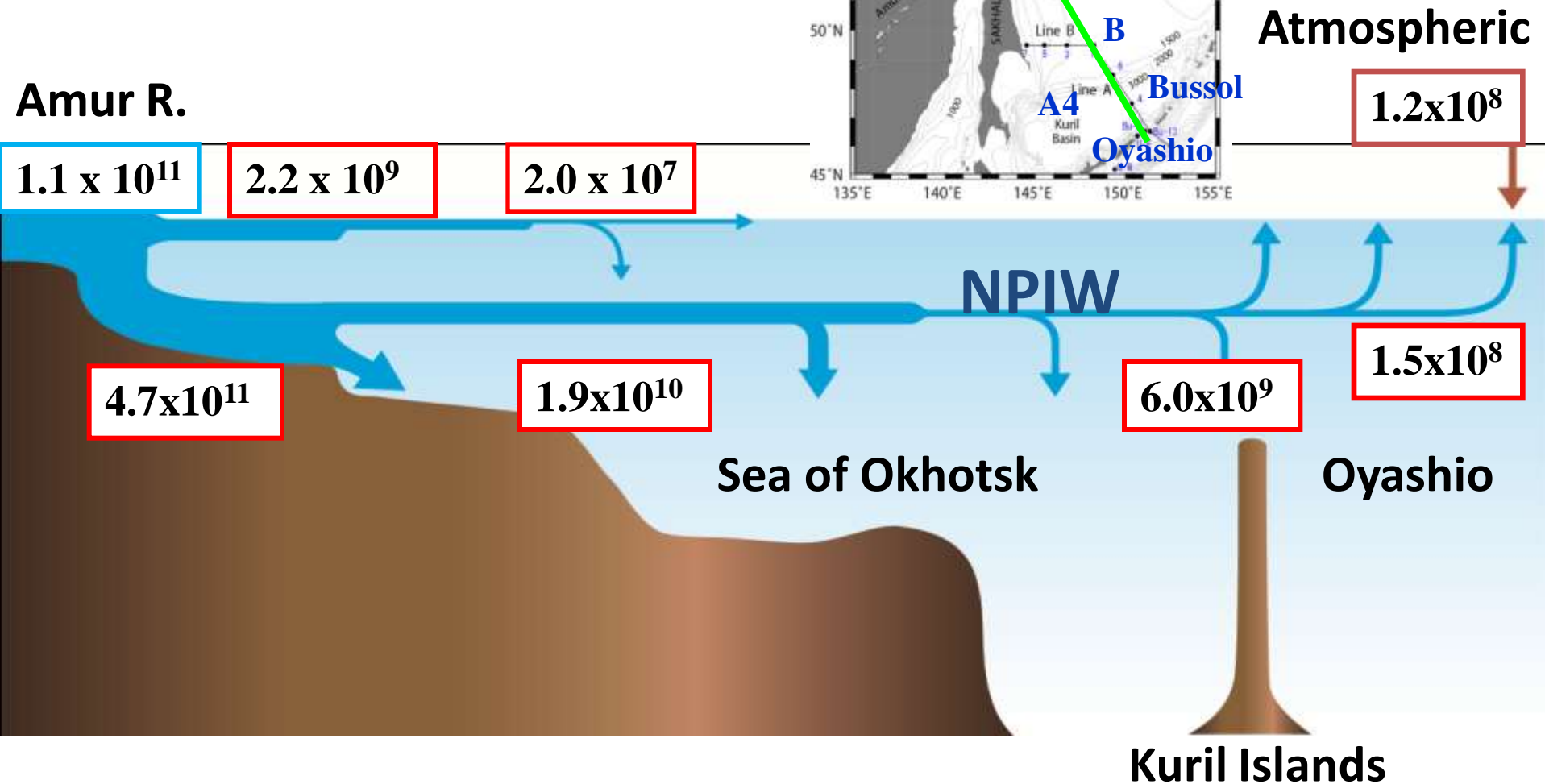
Transport of the dissolved iron

2. From Amur river mouth to the Sakhalin Bay



Nagao et al. (2008)

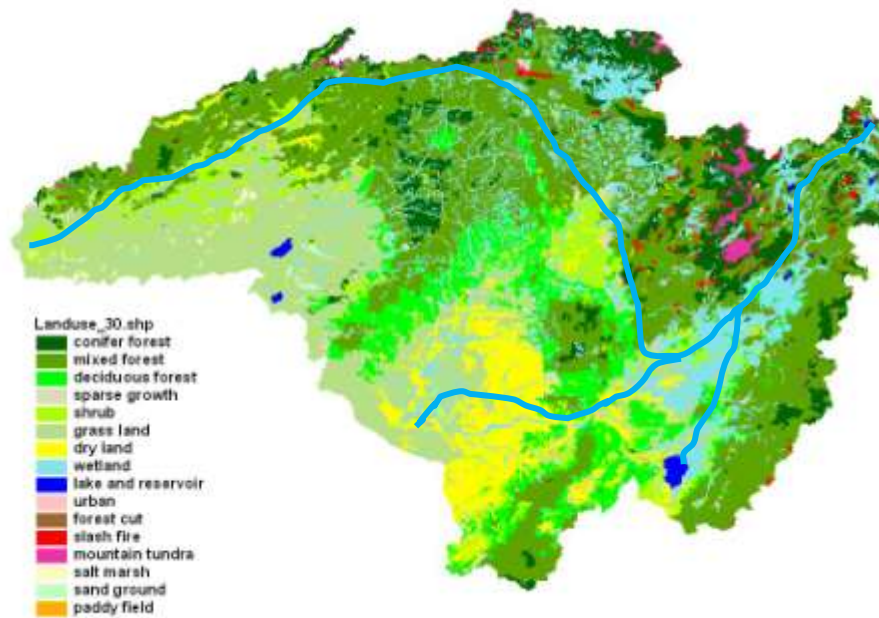
Summary of total iron (g/yr) transport



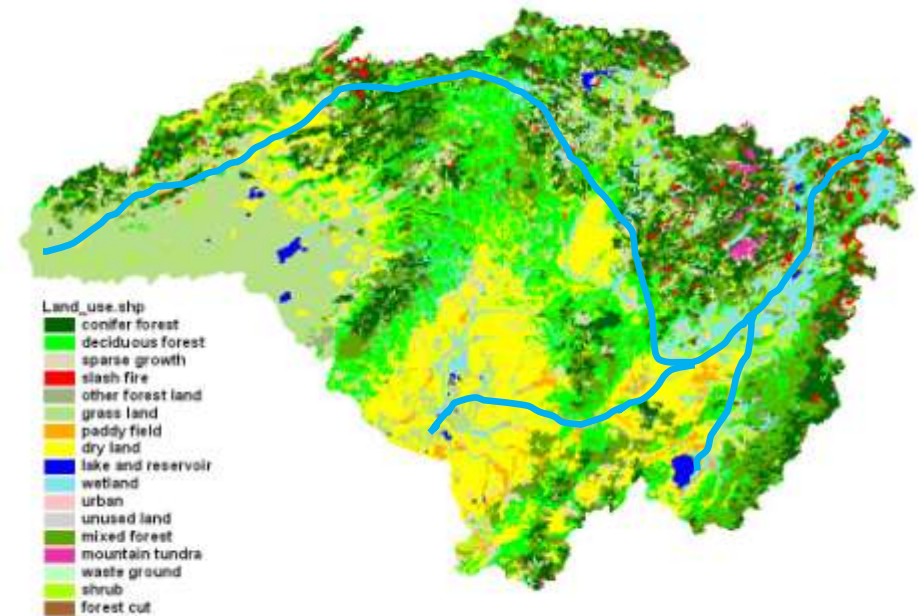
Contents

1. Does dissolved iron from the Amur River basin support the primary productivity in the Sea of Okhotsk and Oyashio region ?
2. Was (Is) there any influence of land-use changes in the Amur River basin on the flux of dissolved iron (and the primary production) ?
3. Proposed strategy for the conservation of GFBF and the ecosystem in the open waters.

Land cover/Land use changes in the Amur River basin between 1930s and 2000



1930s

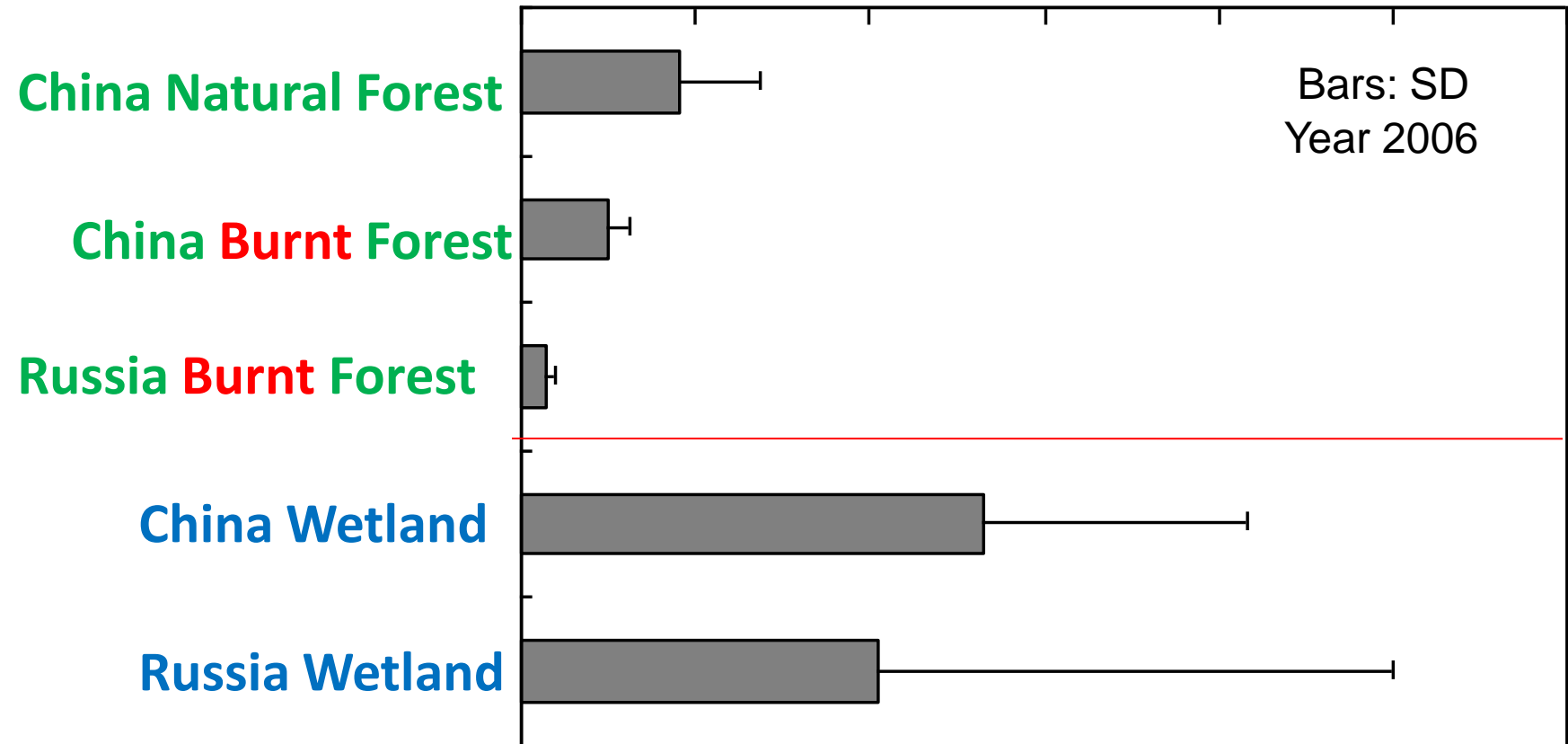


2000

Ermoshin and Ganzey (2008)

Dissolved iron concentrations (mg L^{-1}) measured at basins having various land-covers

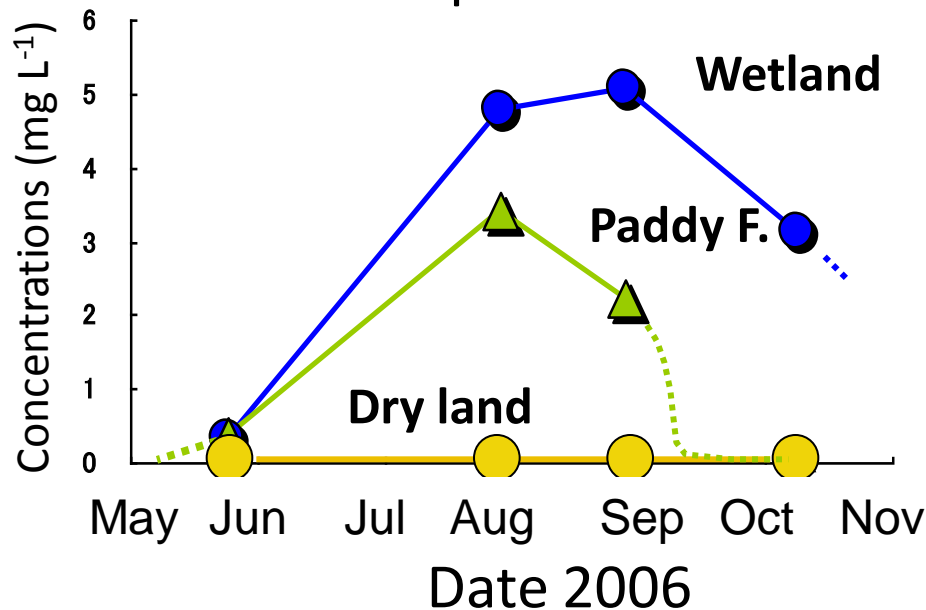
0.0 0.5 1.0 1.5 2.0 2.5 3.0



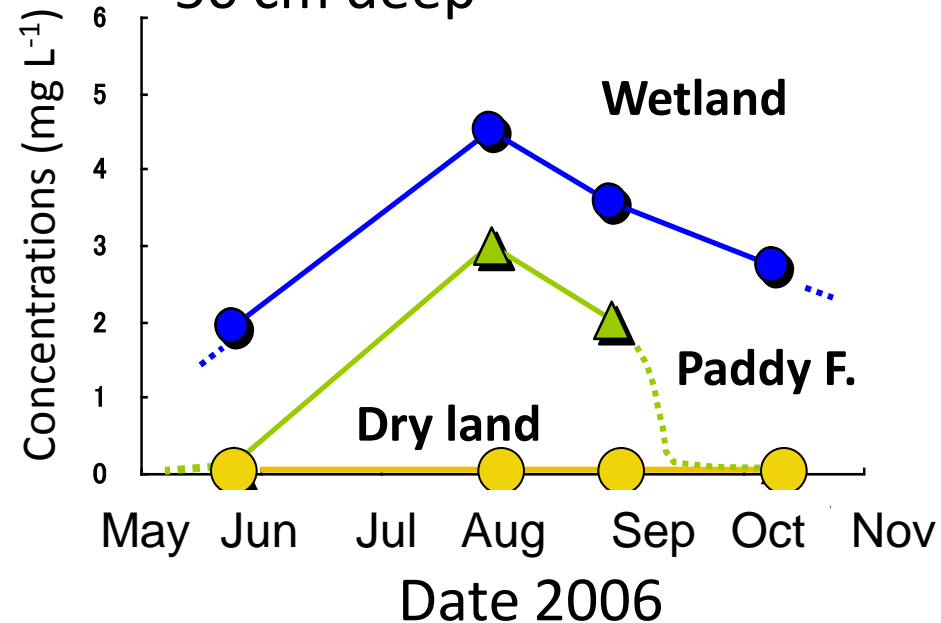
Shibata et al. (unpublished)

Seasonal changes in dissolved iron concentrations in the interstitial soil water at various land-cover in the Sanjiang Plain 2006

10 cm deep

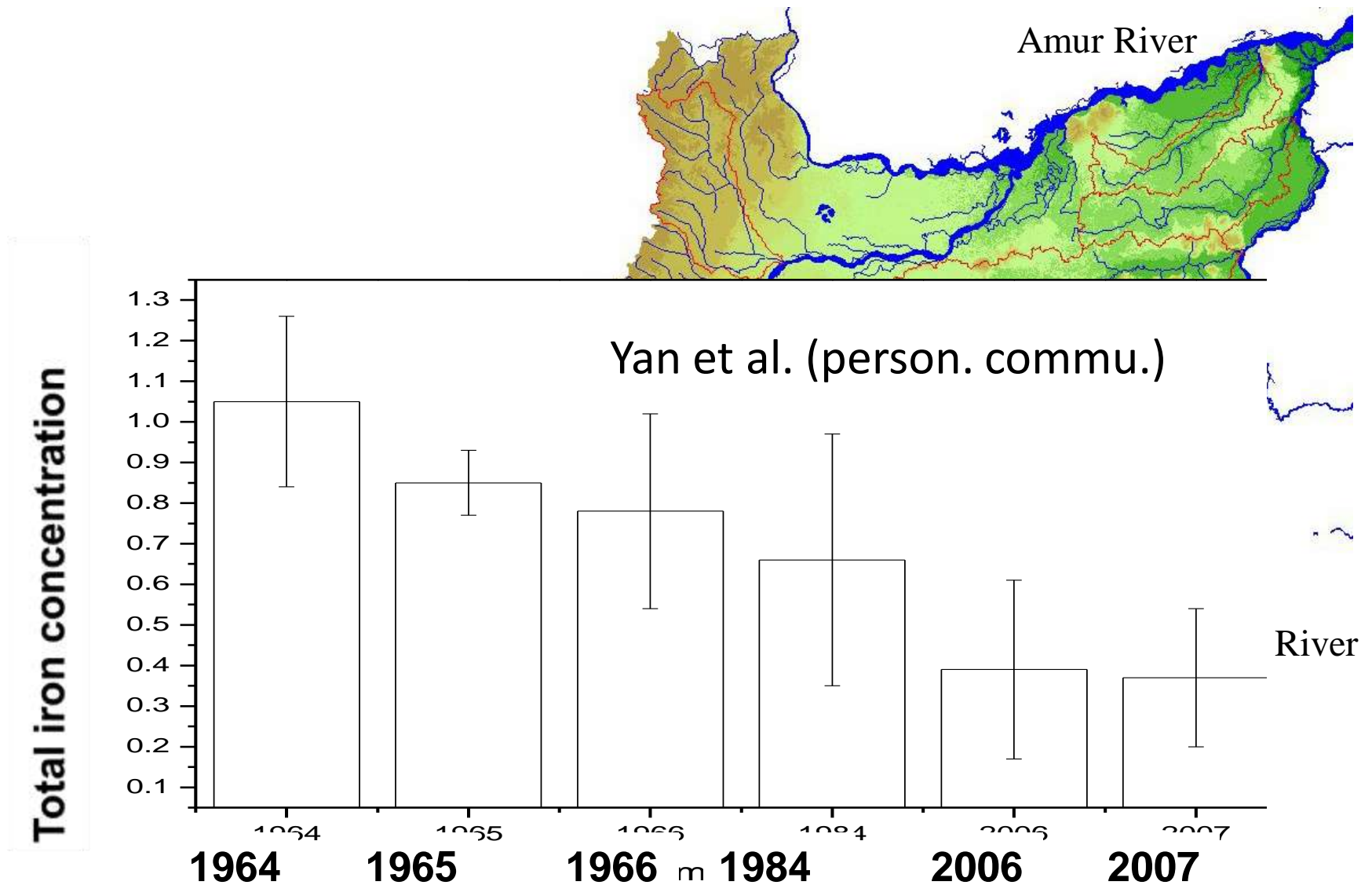


50 cm deep

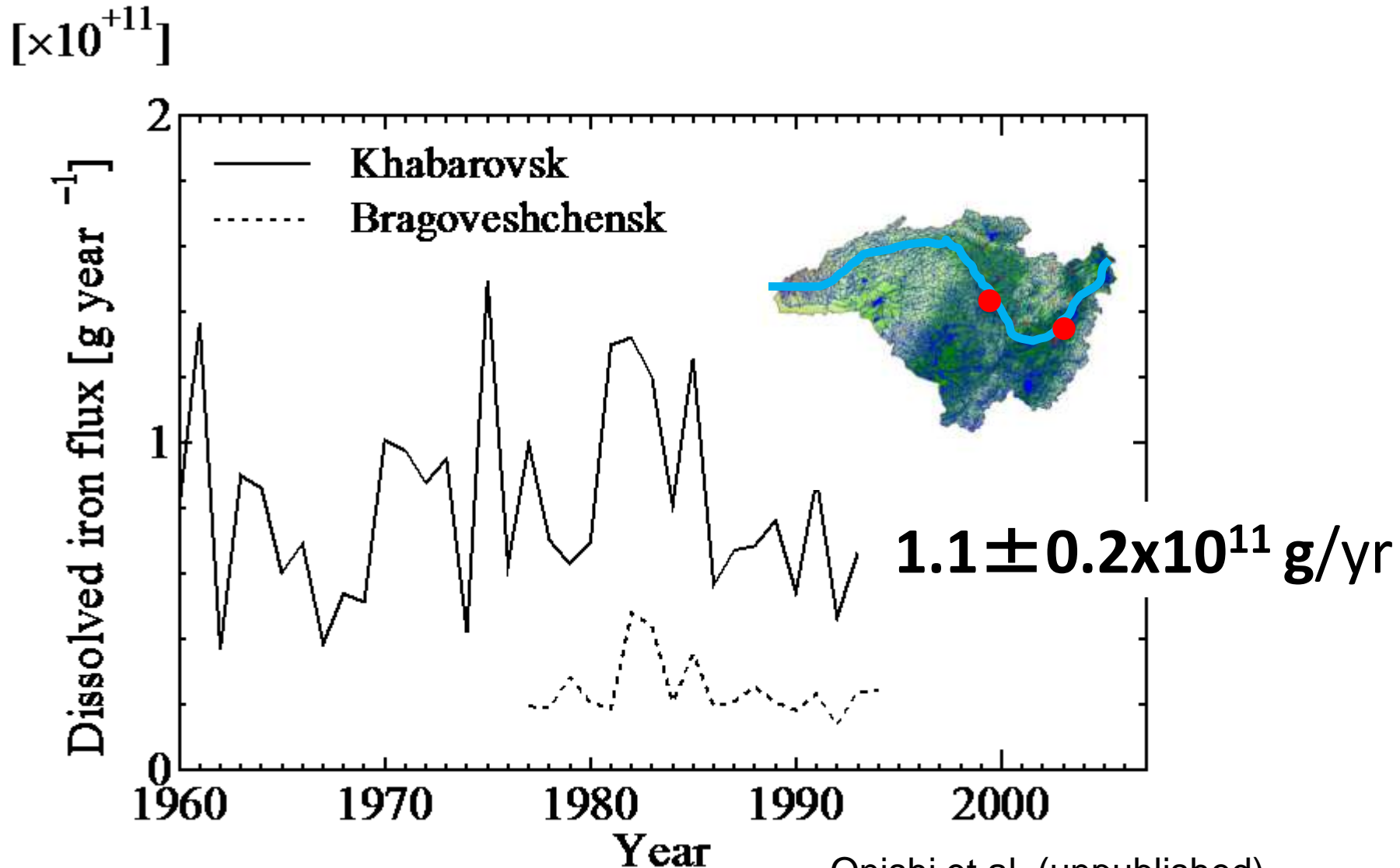


Yoh et al. (unpublished)

Total iron conc. in Naoli River, Sanjiang plain, China (mgL^{-1})



Annual changes in iron transport by the Amur River



Onishi et al. (unpublished)
Data source: ROSHYDROMET

Contents

1. Does dissolved iron from the Amur River basin support the primary productivity in the Sea of Okhotsk and Oyashio region ?
2. Was (Is) there any influence of land-use changes in the Amur River basin on the flux of dissolved iron (and the primary production) ?
3. Proposed strategy for the conservation of GFBF and the ecosystem in the open waters.

“Giant” Fish-Breeding Forest
(Guiding Principle or Concept)

Initiatives of IOs (UNEP, UNDP, GEF) or NGOs
bilateral economic assistance (ODA)

North-Eastern Asia GFBF Partnership

Interlinkage and coordination of the
international legal regimes

Law of the conservation of nature,
species and biodiversity

Law of the
international
watercourses

Law of the marine
living resources
and diversity

Grassroots activities of NGOs

**Conclusion of new environmental
agreements**

Bilateral agreements or
joint declaration, communiqué

Agreements among neighboring
provinces or local governments

National legal system or policy
(coordination between the laws and agencies)

Local government policy
(inc. coordination between national and local policy)

Commitment or participation of the
local or indigenous peoples

HELCOM

Helsinki Commission

All the coastal states around the Baltic Sea and EU are working together to protect the Baltic marine environment from all sources of pollution, as spelled out in the “Convention on Protection of the Marine Environment of The Baltic Sea Area” (Helsinki Convention).

HELCOM has overall responsibility for the implementation of the Helsinki Convention.



STRUCTURE OF HELCOM



オホーツク海の 未来可能性のために

Environmental Conservation of the Sea of Okhotsk: Cooperation between Japan, China and Russia

オホーツク海の環境保全に向けた日中露の取り組みにむけて

11/7 SAT + 8 SUN

北海道大学学術交流会館 第一会議室
〒060-0808 札幌市北区北8条西5丁目 TEL: 011-706-2141 (全線英語)

| プログラム | 日本語 中国語 ロシア語 (同時通訳あり)

11月7日(土) 9:15 ~ 18:00

- セッション1 アムール川流域とオホーツク海の自然
- セッション2 アムール川流域の土地利用変化とその影響
- セッション3 アムール川流域の土地利用変化の背景

11月8日(日) 8:30 ~ 19:00

- セッション4 アムール川保全のための中露の取り組み
- セッション5 オホーツク海保全のための日露の取り組み
- セッション6 農林工・林業工保全のための日中協力
- セッション7 多国間の協働によるオホーツク海の保全
- 総合討論 学術ネットワークの確立に向けて

| 主催 | 北海道大学海洋科学研究所 環オホーツク圏研究センター
北海道大学スラブ研究センター
総合地球環境学研究所
北見工業大学未来エネルギー研究センター
国土交通省北海道開発局
国領大学研究センター
北海道大学「地球可能性の探求」国際戦略本部

| 共催 | 文部科学省

参加
無料
事前申込
不要

| お問い合わせ先 |

北海道大学海洋科学研究所
環オホーツク圏研究センターシンポジウム事務局

FAX: 011-706-7142
E-mail: ao-sym.posum@glwtem.hokudai.ac.jp
<http://www.chikyuu.ac.jp/AMORE/2009symposium.html>

Amur Okhotsk Consortium

Regular meeting: 1 time / 2 years
Network for academic researchers
Information/data exchanges
Japan, China, Russia (Mongolia)

Tentatively based on
Pan-Okhotsk Research Center,
Institute of Low Temp. Science,
Hokkaido University

Conclusions

1. The GFBF hypothesis was proposed and validated;
2.
 - 1) Land-use change impact was clear in tributary scale;
 - 2) Land-use change impact is still controversial in basin scale (need to be studied in 2009);
3.
 - 1) Review of the existing laws and policies;
 - 2) Necessity of North-East Asia GFBF Partnership for the conservation of marine ecosystem was proposed;
 - 3) Launch of the international network named “Amur-Okhotsk Consortium”.

