Linkages in forested watershed environments

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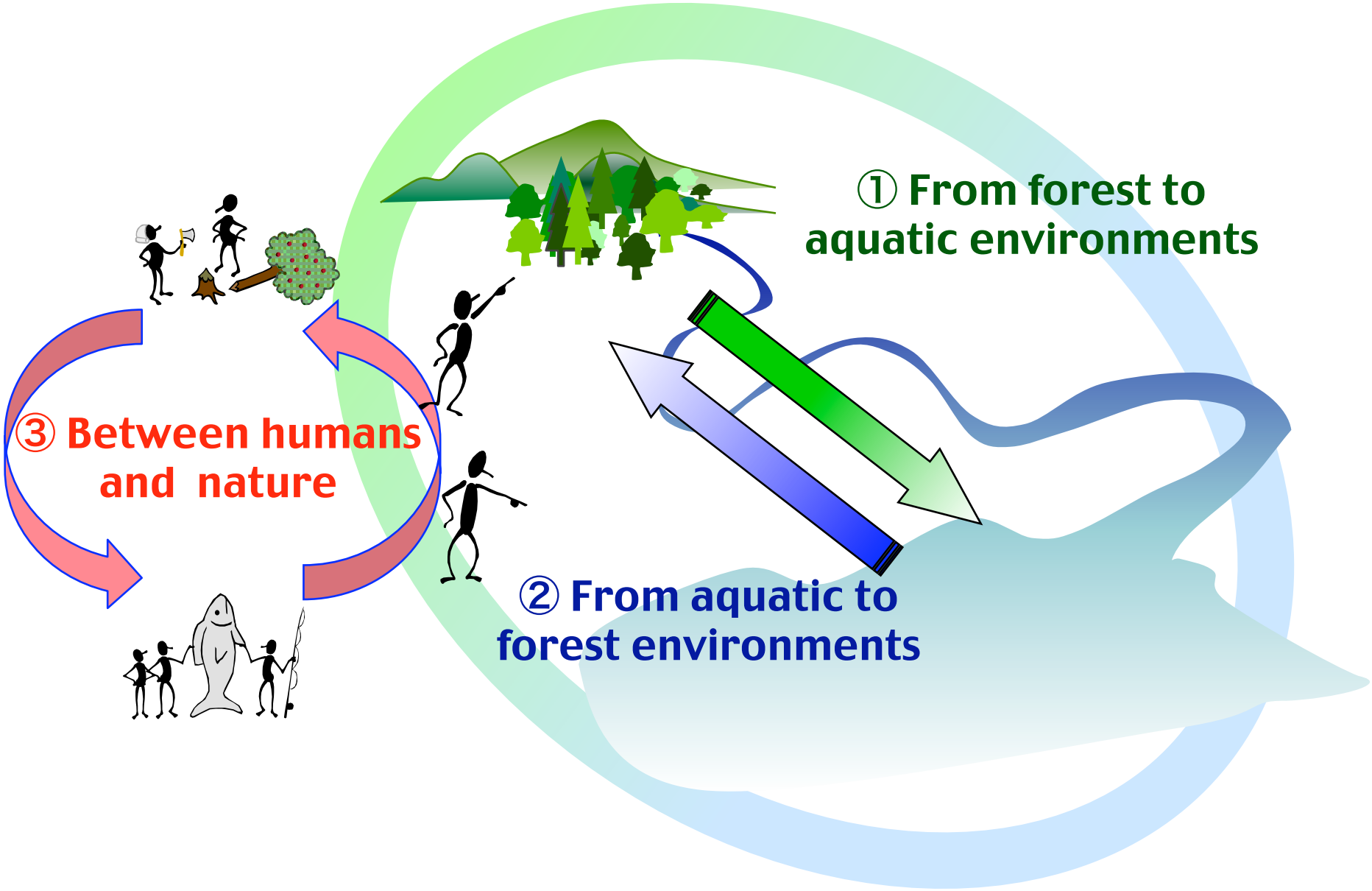
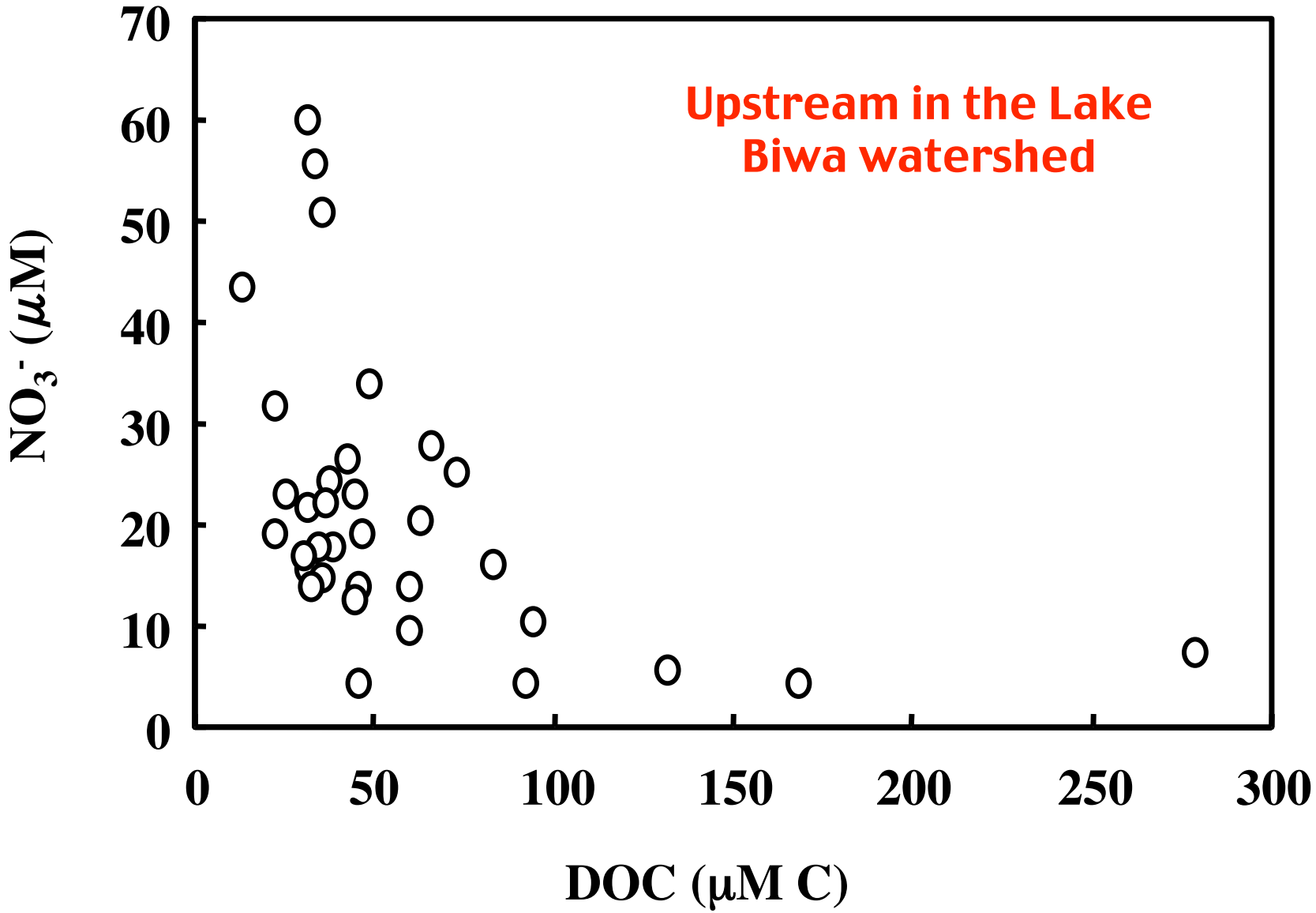
Three types of biogeochemical linkages in forested watershed environments

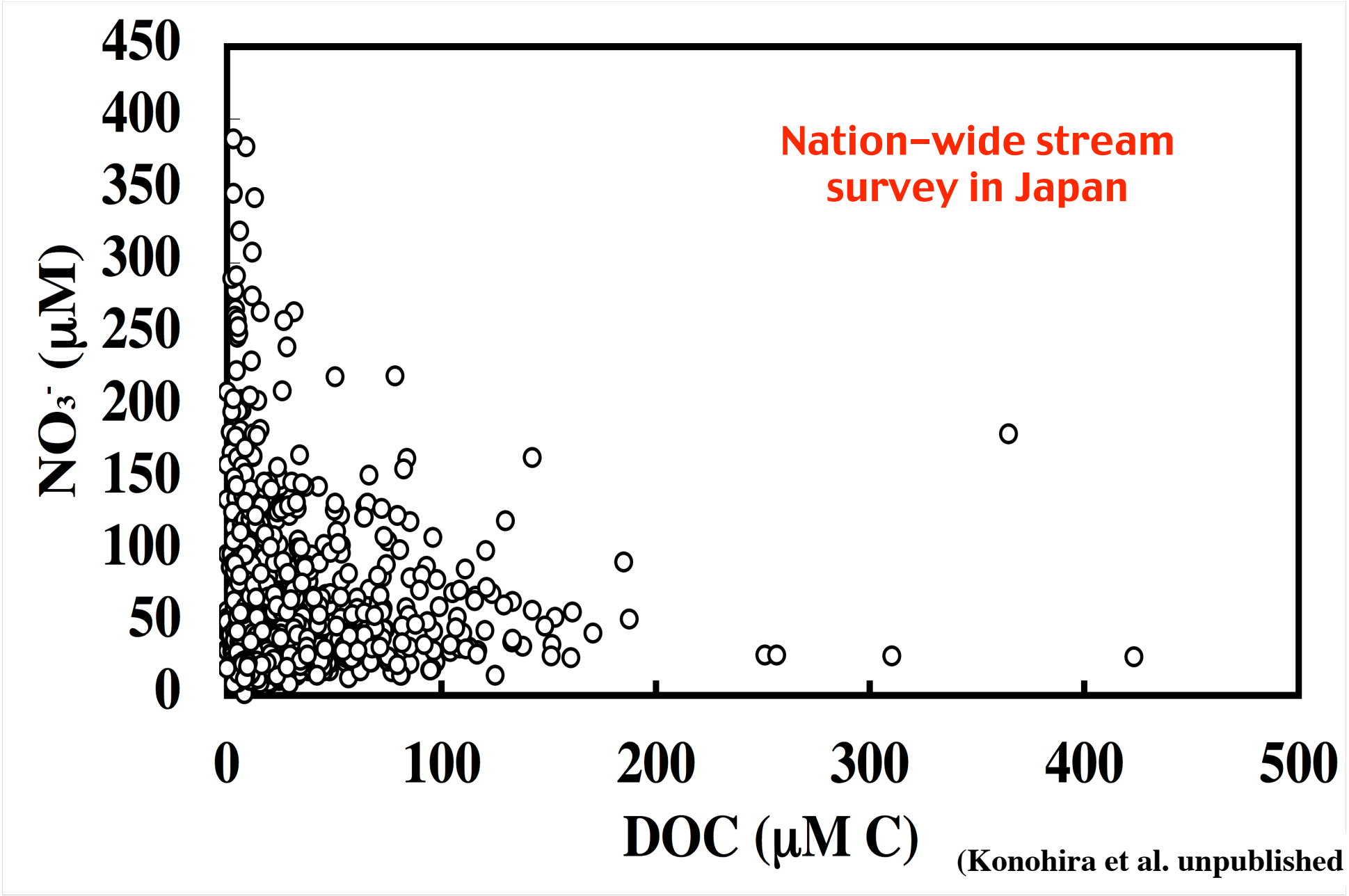


Relationship between stream DOC and NO_3^-



(Konohira and Yoshioka 2005)

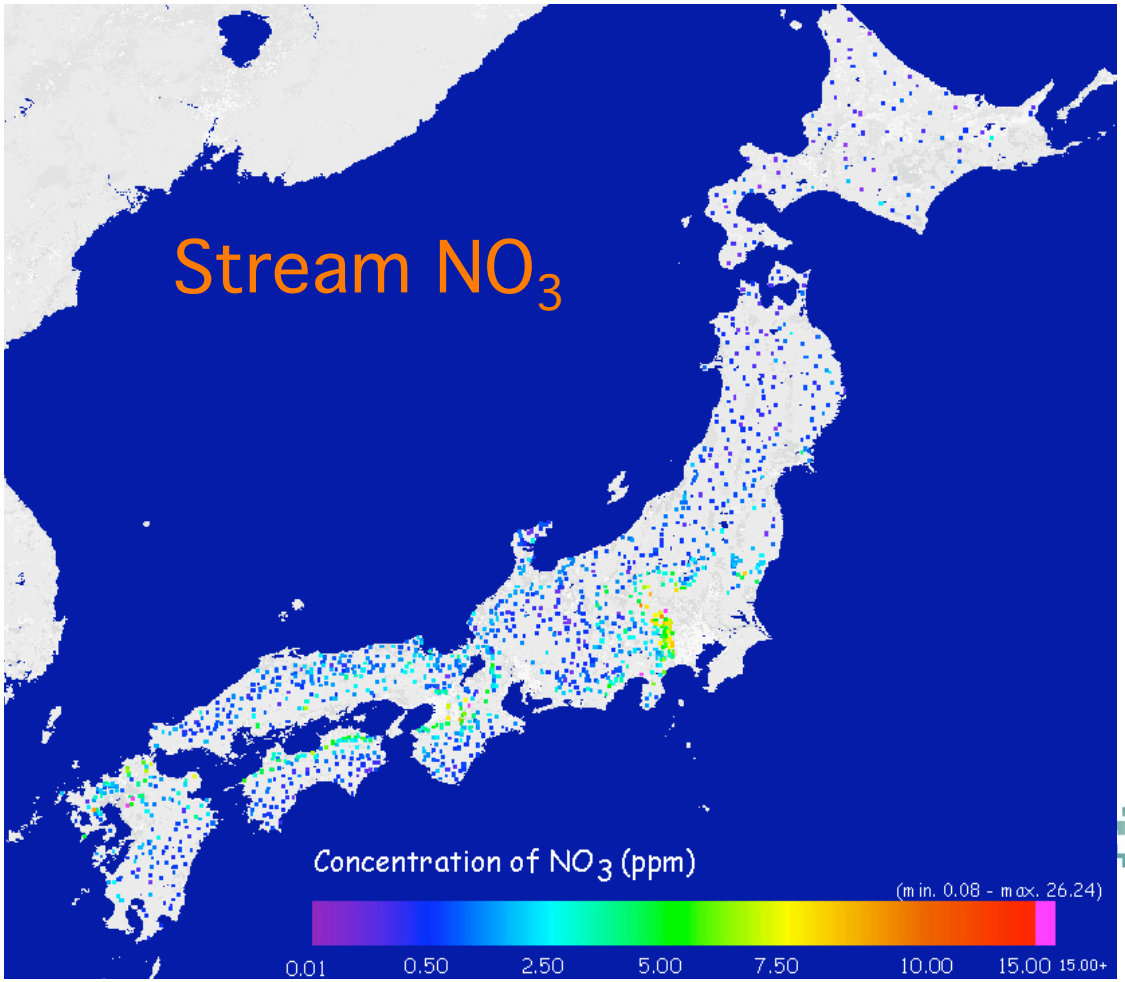
Relationship between stream DOC and NO_3^-

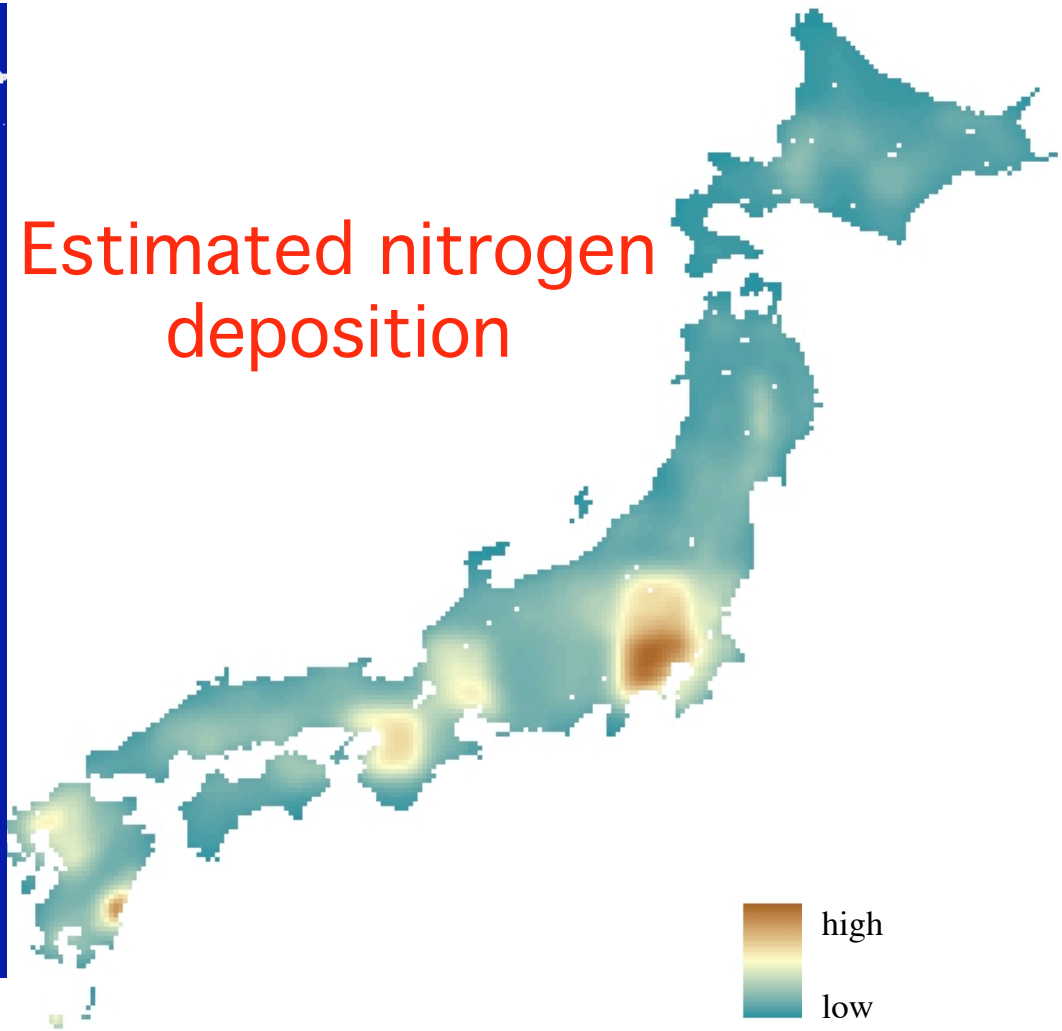


(Konohira et al. unpublished data)

① Forest → Aquatic

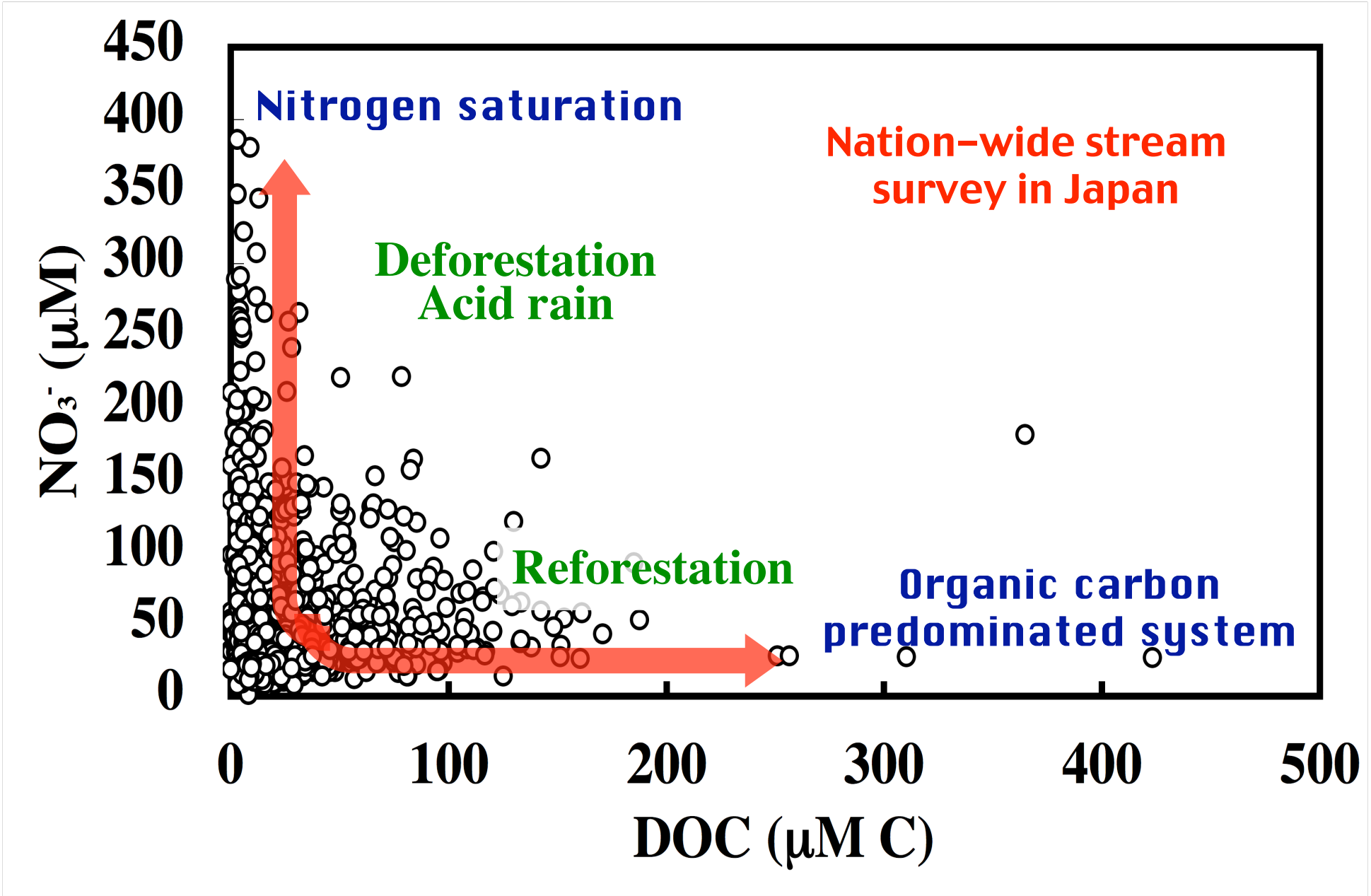
Nationwide survey on stream hydrochemistry





(Shindo et al. 2005)

Nationwide survey on stream hydrochemistry



Linkage from aquatic to forest environments

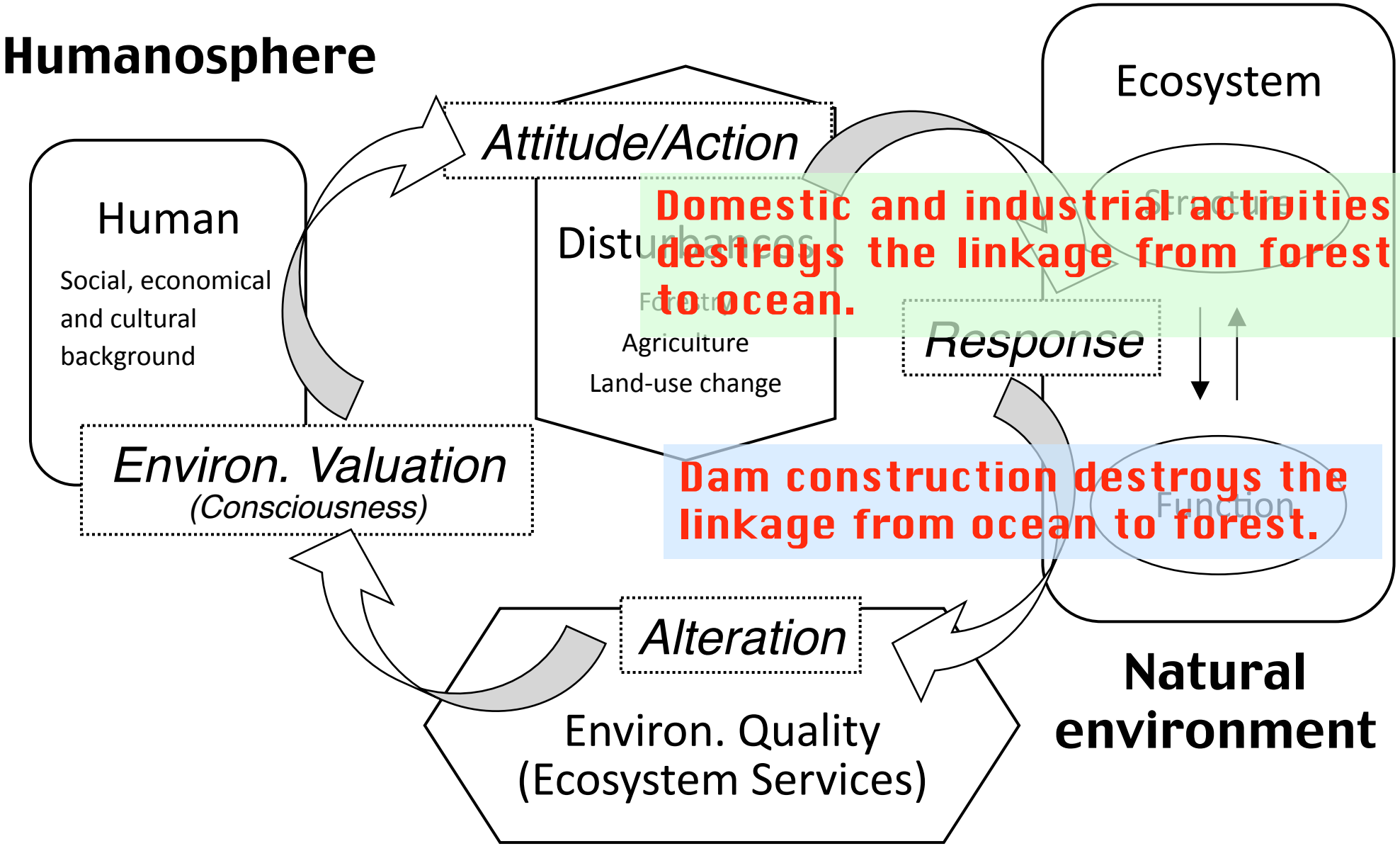
Nutrient supply from aquatic to forest environments by anadromous fishes and aquatic invertebrates

From the isotopic analyses, more than 20% of terrestrial nitrogen was originally derived from salmon in the North Pacific (Helfield & Naiman 2002, Hocking & Reimchen 2002).

③ Humans ⇔ Nature

Interaction between humanosphere and environment

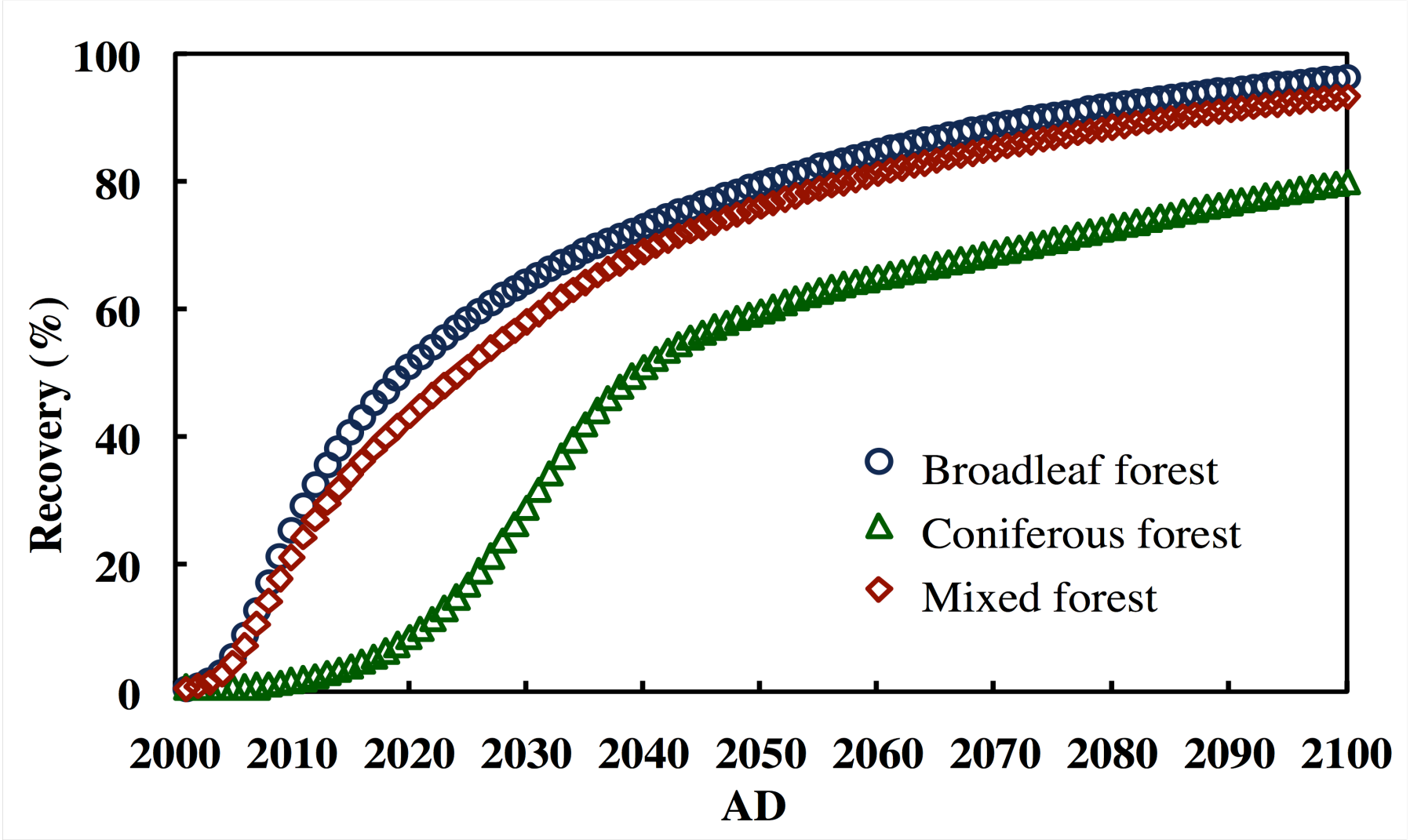
(Modified from the Research Initiatives Subcommittee of the LTER Planning Process Conference Committee and the Cyberinfrastructure Core Team 2007)



Domestic and industrial activities destroys the linkage from forest to ocean.

Dam construction destroys the linkage from ocean to forest.

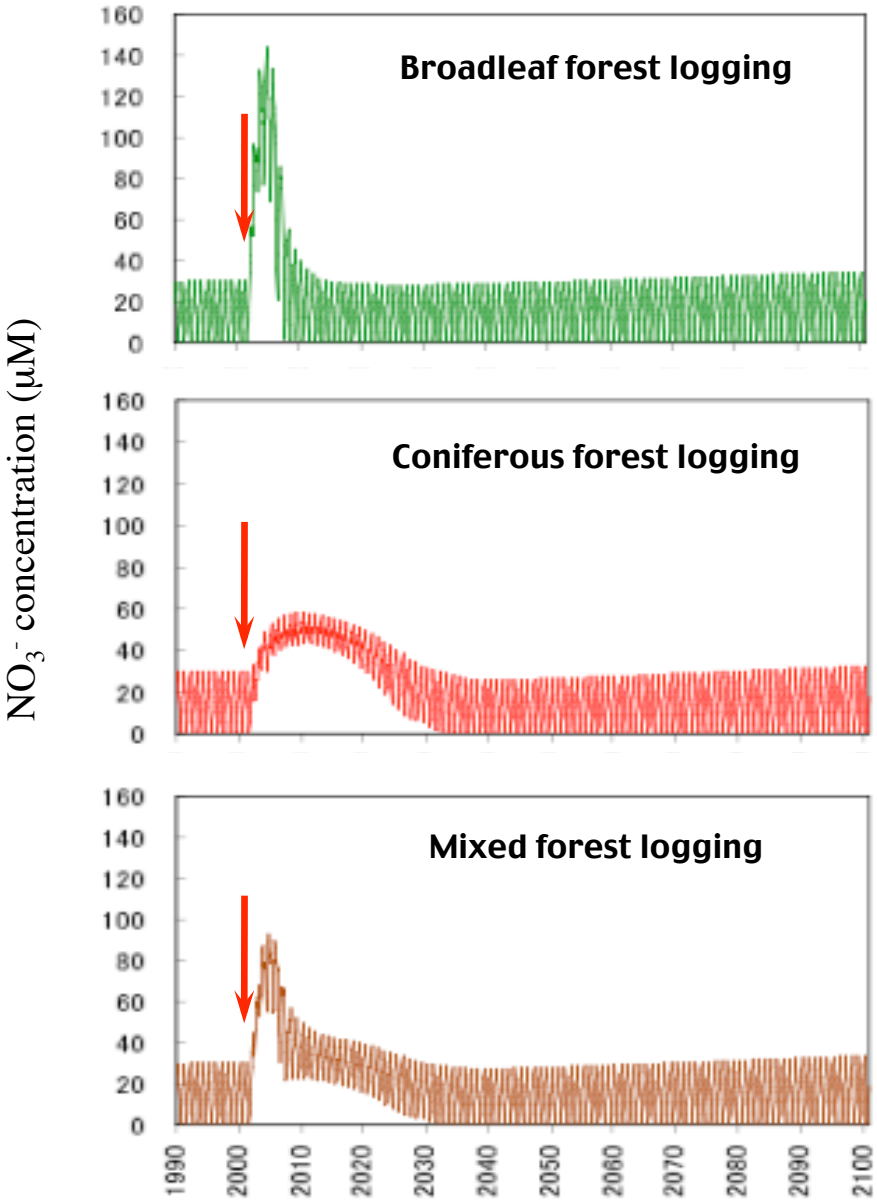
Simulation results of the recovery of forest biomass after logging in 2001, using PnET-CN model



(Shibata *et al.* unpublished data)

③ Humans → Nature

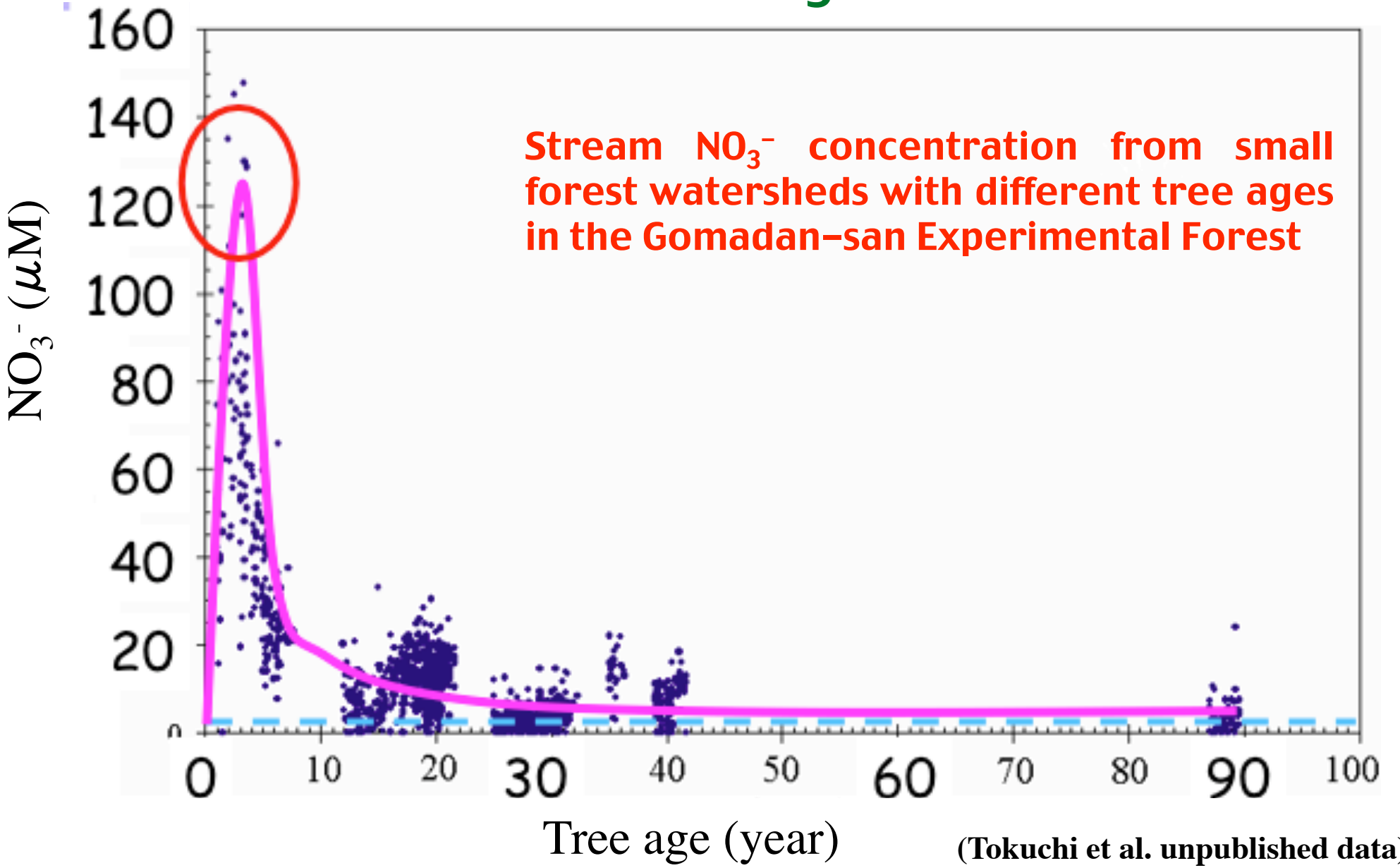
Simulation results of stream NO_3^- concentration after tree cutting in 2001



Red arrows: year of tree cutting

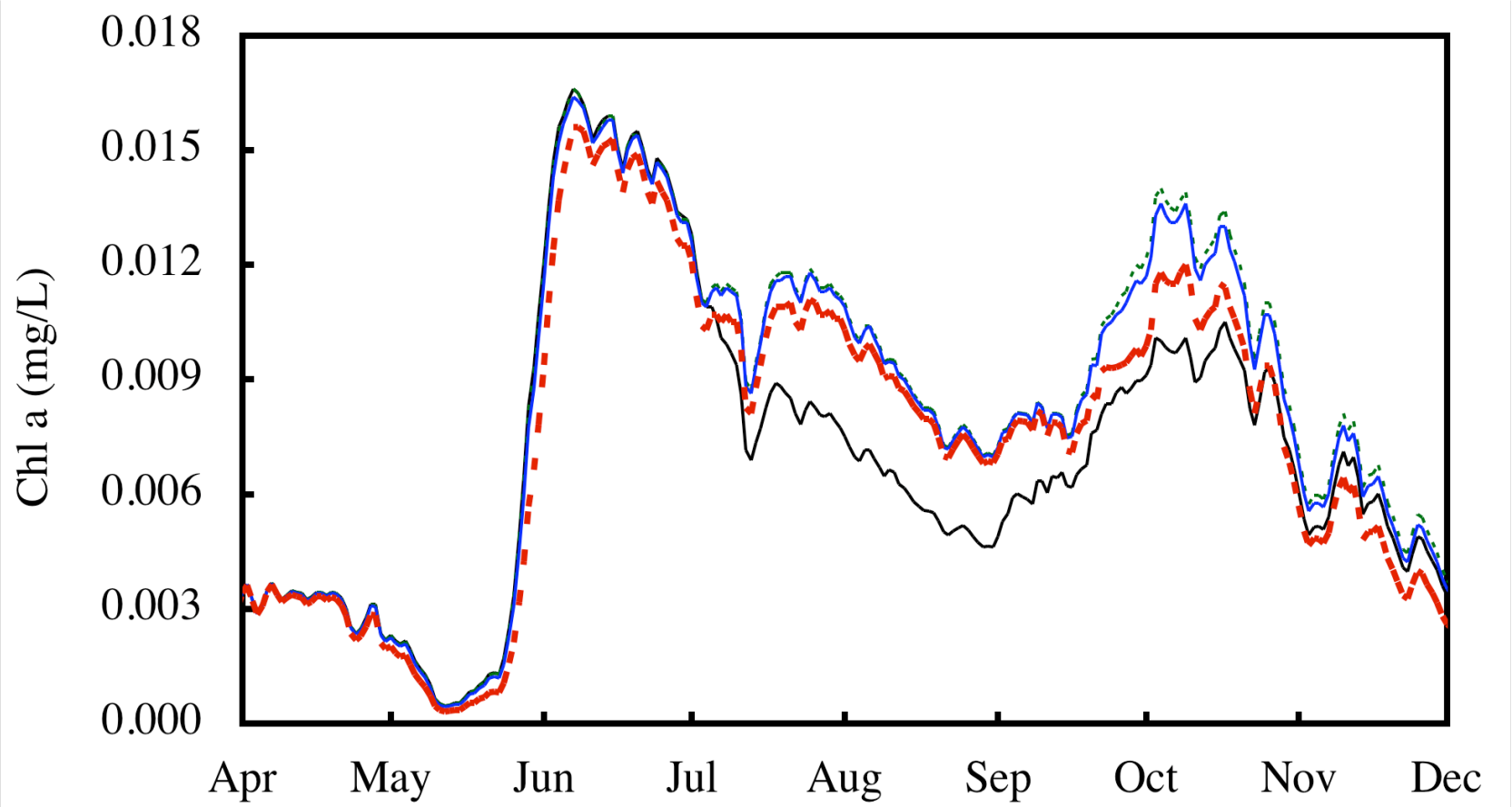
(RIHN Brochure 2007-2008)

Simulation results of stream NO_3^- concentration after tree cutting in 2001



(Tokuchi et al. unpublished data)

Simulation results of chlorophyll *a* concentration near the river mouth of Akaishi River



Phytoplankton biomass change at the mouth of an inflow river (3 years after tree cutting).
Tree cutting areas are as follows: Green, 0.8 km^2; blue, 4 km^2; red, 20 km^2.

(Kutsukake *et al.* unpublished data)

③ Nature → Humans

Results of Scenario Questionnaire

Decrease in forest landscape (area)

Decreases in the plant biomass and diversity

Uses in recreations

Occurrence of turbid water

Turbid water

Deterioration of river and lake water quality

Water quality

Scenario Questionnaire

People's preferences on environmental changes
(estimating from partial utility values)

Firstly minded attribute

Water quality

Secondary minded attribute

Preferred its deterioration

(After RIHN Brochure 2008)

③ Humans ⇔ Nature

Preparation Procedure for Scenario Questionnaire

SOCIAL SCIENCES
Interests on watershed environments

COLLABORATION

NATURAL SCIENCES
Response-Prediction Models

Keywords on watershed

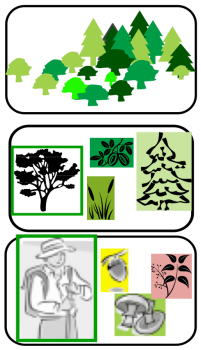
Scenarios

Model developments

Selection of virtual impacts

Environmental attributes (5 items) of people's interests

Simulations, Observational and literal data



Turbid water

Water quality

Changes in environmental attributes

Preparation of conjoint analysis

Scenario Questionnaire

Contribution to the SEA process

(After RIHN Brochure 2008)