

# Climate Change and Ecosystem Management

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Integrated Research Program  
for Advancing Climate Models

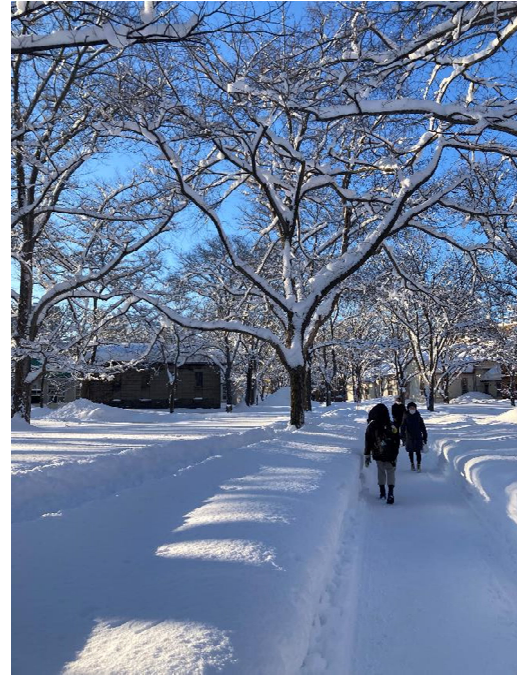


科研費  
KAKENHI

“2022 HOKKAIDO サイエンスフェスティバル・北海道国際サイエンスフェア(HISF), Feb. 15, 2022

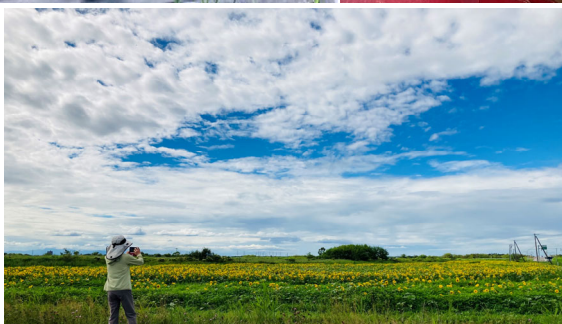
Brief introduction of myself





## “International conference?”

- (1) Music Festival
- (2) Science Festival**
- (3) Sports Festival





# What's International Conferences?

- **Scientists, engineers, and policy makers** in the same field from around the world gather.
- **Appeal** your research and efforts to **discuss** with others.
- Learn **new ideas** and **techniques** by listening to the presentations of others.
- 世界中の同じ分野の科学者・技術者・政策決定者が集まる
- 自分の研究や取組を紹介し、議論する
- 世界各国の研究・取組を聞き、新しい考え方や技術を学ぶ

## Communication & Development in Science

- Rotorua, **NZ**, 2020
- Milano, **Italy**, 2019
- Laxenburg, **Austria**, 2018
- Boulder, **USA**, 2017
- Soul, **Korea**, 2016
- Portland, **USA**, 2015
- Pennsylvania, **USA**, 2015



# Experiences staying abroad

## Summer extension at UCLA

2 months in 1994

2nd year university student

- *Learning English*

## Visiting researcher at Univ. Maryland, USA

4 months in 2004

Assistant professor

- *Learning Ecosystem Services*  
@Lab. Prof. Robert Costanza

University of California, Los Angeles (UCLA) Extension  
UCLA Extension's American Language Center [Los Angeles, California]



## 北海道大学農学部/大学院農学院 生態系管理学研究室

### Ecosystem Management Group

Department of forest Science, Graduate School of Agriculture, Hokkaido University, Japan.

Japanese

English

HOME

News

About us

Outputs

Dissertations

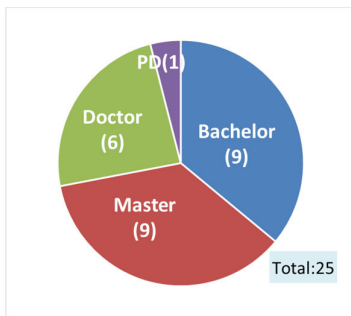
Link

ここは、北海道大学生態系管理学分野のホームページです。

この研究室では、森林生態系のみならず、河川や湿地などを含む複合生態系（またはランドスケープ）がもつ様々な構造と機能（野生生物の生息場、水質形成、木材生産など）を明らかにし、地域の固有性を尊重した生物相の保全、合自然的な資源の利用を目的とした生態系管理計画および技術に関する研究を行っています。また、自然再生に関わる実践的な研究も行っています。[くわしくはこちらへ](#)。

当研究室では、基礎・応用両面に興味を持った志の高い学生を広く募集しています。修士・博士課程として当研究室をお考えの場合には、早めに教官にコンタクトをお取りください。学振ボスドクも歓迎いたします。また、当研究室に関心を持ってくださった方の訪問を歓迎いたします。

This is a site for various studies in ecosystem management, landscape ecology, and biological conservation being carried out by members of the research group headed by Futoshi Nakamura and Junko Morimoto in the Faculty of Agriculture at the Hokkaido University, Japan.







## Environmental Changes in Japan due to Climate Change



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## **Extreme phenomenon under future warming climate conditions**

**- A simulation of global ocean waves, regional typhoons,  
and related river flow and storm surge in Japan -**

- \* Simulation is based on the d4PDF mega-ensemble climate dataset
- \* Ocean waves and typhoons (rain and cloud cover) are indicated by colored shaded regions
- \* River flows over eastern Japan are indicated by colored lines
- \* Rivers that flow beyond present design levels are marked with red cones
- \* Storm surges are indicated by coastal sea height



# Typhoons under warming climate in Hokkaido?

•Wind Speed?



(1) increase

(2) decrease

(3) no change

•Precipitation?



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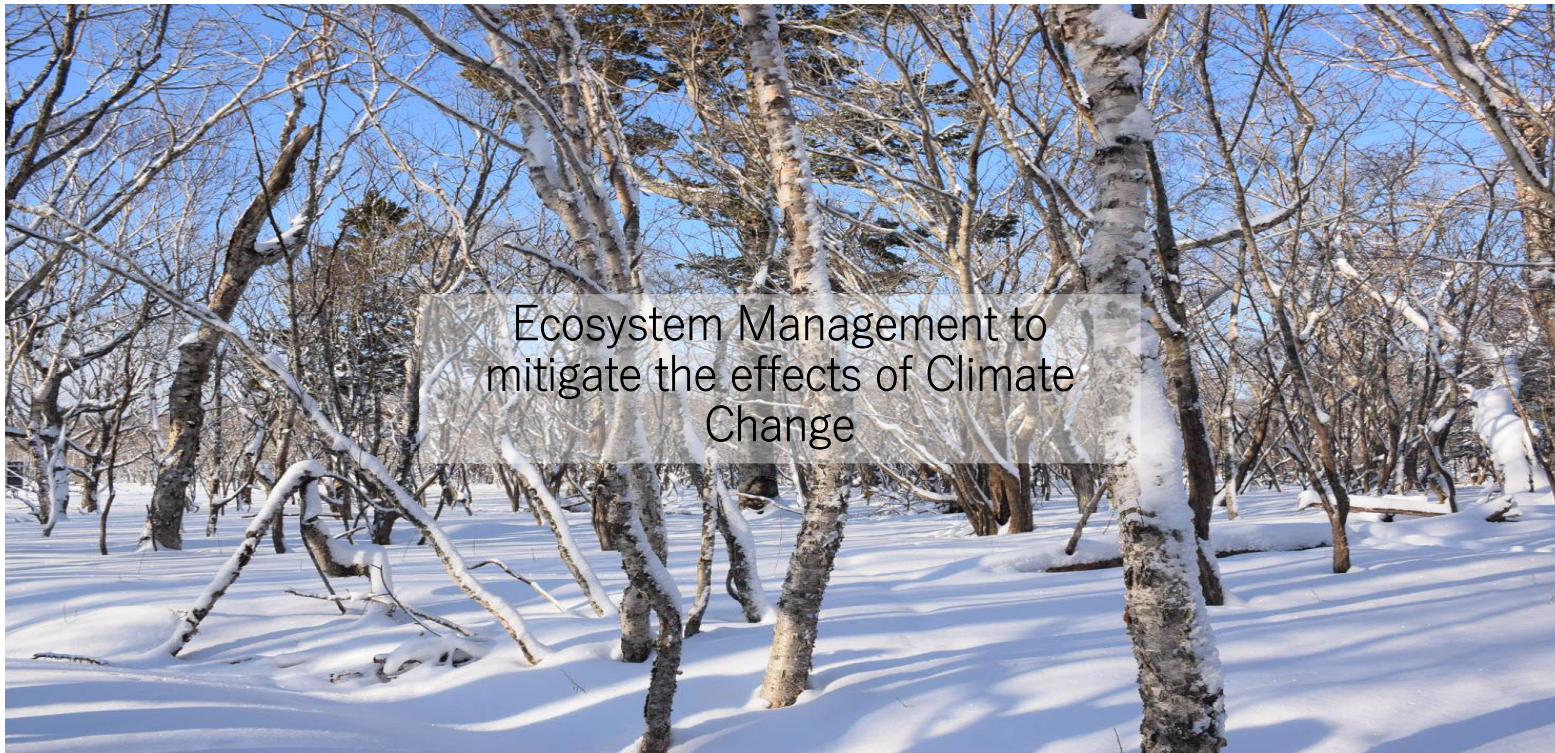
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## Seamless environmental changes and projections from the past to the future

- A simulation of water resources and typhoon intensity in Japan -

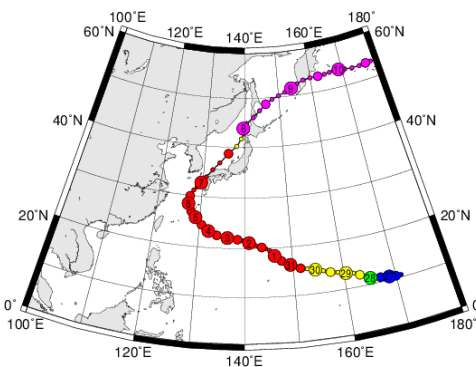
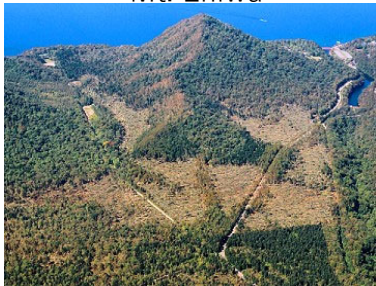
- \* Simulation is based on the MRI-AGCM climate model
- \* Water resources are indicated by colored shaded regions over land
- \* Snowfalls are indicated by land height
- \* Wind speeds (maximum potential intensity) are indicated by colored shaded regions over ocean
- \* All values are deviations from the 1981-2010 average and a 10-year moving mean





## Typhoon no18(Songda) attacked Hokkaido in 2004

Mt. Eniwa





# What is the best management for the forest restoration?

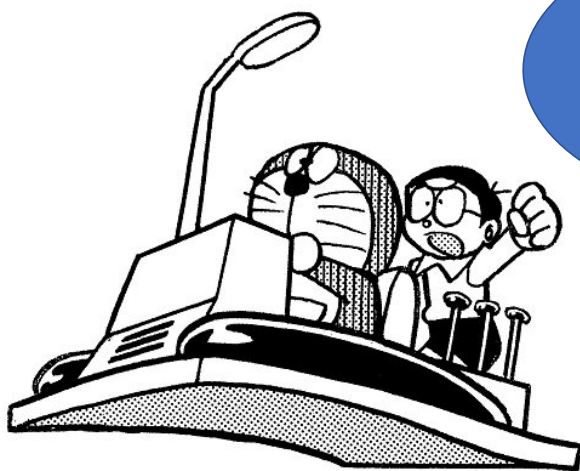


**Legacy retention -- Do nothing --**





## Salvage logging (removing damaged trees) and Planting



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# 15 years after the Salvage logging & Planting



# 15 years after the windthrow







15 years after



What is the best management ?







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