# Environmental Prediction Science Lab.
# - Our Goal and Direction

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*many thanks to Muto-san and Shiojiri-kun for arrangements*

A World Beyond Predictions
Environmental Prediction Science Laboratory

2023/04/06 the 2nd Laboratory Conference

# Today's Talk

Our Mission & Strategy
Our Circumstance & Direction
Our Actions

# Our Mission & Strategy

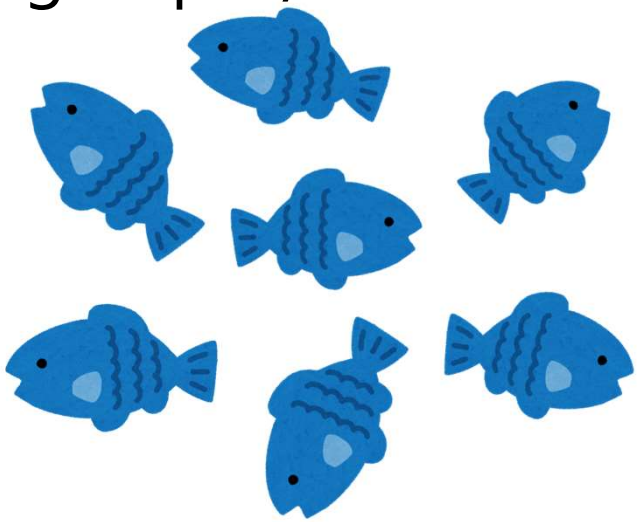
# Why Mission?

Environmental Prediction Science Laboratory

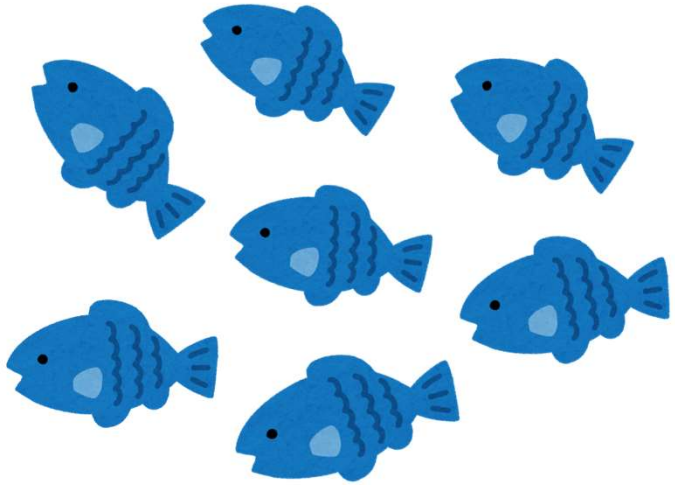
**We have grown up, and reached to dynamic equilibrium.**

**To maximize our outcomes, we need to share our mission.**

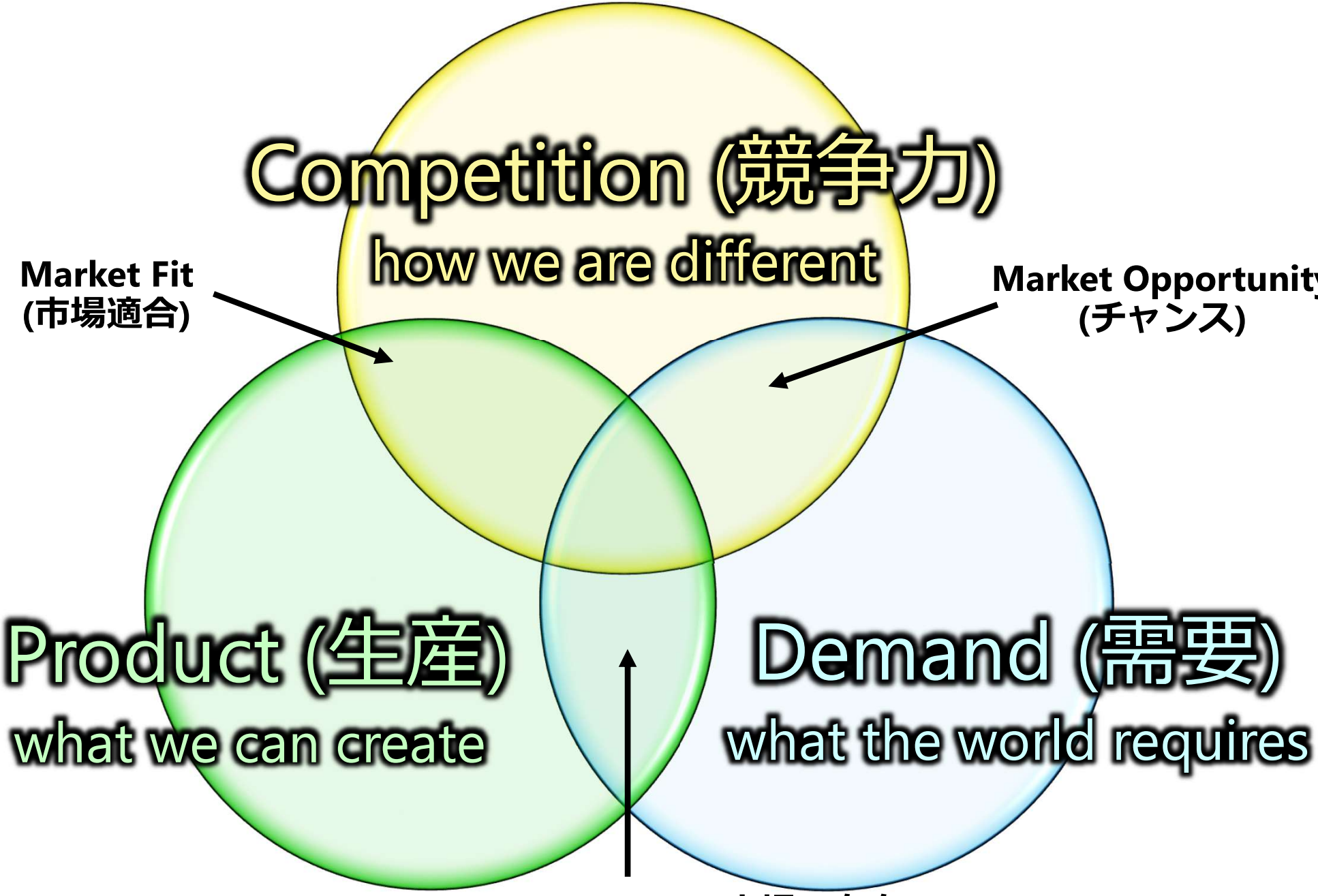
a group w/o mission



a team w/ mission



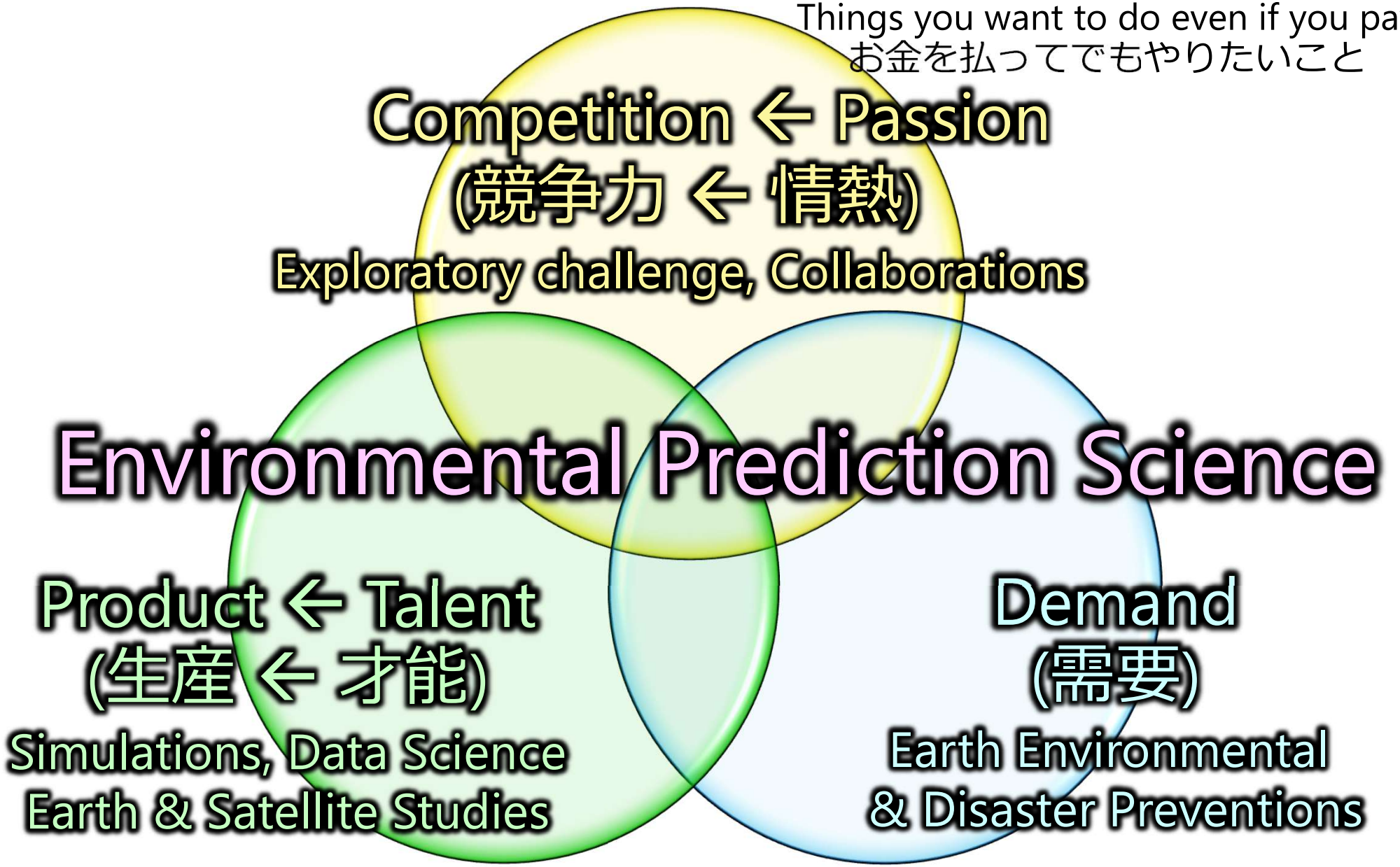
# Strategy: Product Market Fit



# Why Environ. Prediction?

Environmental Prediction Science Laboratory

Things you want to do even if you pay
お金を払ってでもやりたいこと




Things we can do easier than others
人より楽にできること

Our values that can improve society
社会を良くできる存在価値

# Mission Statement

Environmental Prediction Science Laboratory

## Our Purpose: What roles do we play?
## 理念: 我々は何者か？何のために存在するか？

- Science: to deepen data and earth science to create global environmental predictions.
- Education: to encourage “active” members who will lead society in the next era.
- Society: to realize social implementations for disaster preventions w/ collaborators.

- 科学: データサイエンスを活かし、我々だから可能な地球環境予測技術を創造する。
- 教育: メンバーの成長を通して、日本・世界で活躍する能動的な人材を育成する。
- 社会: 官公庁・研究所・企業と協働し、防災に関わる具体的な社会実装を実現する。

## Our Positioning: How are we differentiated?
## 戦略: 我々はどう差別化されるか？

- Strengthen data science and methodologies to solve geoscience problems.
- Issue-driven. to solve unique & interesting problems rather than just improvements.
- To respect the number of challenges/trials, rather than prioritizing the success rate.

- データ同化や機械学習等のデータ科学・方法論を深め、地球科学の問題を解決する。
- Issue-driven。問題を“良く”解くのではなく、ユニークな“良い”問題を設定して挑戦。
- PMFを意識し、失敗を恐れず挑戦する。成功率の高さでなく、挑戦の数で勝負する。

# Mission Statement (cont'd)

Environmental Prediction Science Laboratory

## Our Ambition: How far will we go?
## 目指すべき姿: 我々の成し遂げるべきは何か？

・Becoming a global environment and data science research hub in Japan.
・Becoming a leading group in the field of Earth science
in the publication and realization of social implementation.

・国内における地球環境・データサイエンス研究の知見が集まる拠点となる。
・地球科学分野において、論文発表・社会実装実現のトップグループを目指す。

## Our Values: What are our standards?
## 価値観:　我々は何を尊重するか？

・Strengthening our competence while challenging ourselves in new areas (80:20).
・Respecting other members & achieving outcomes that cannot be accomplished alone.
・Providing chances with allowance of failure for researchers and students.

・我々のコンピタンスの強化と、新しい分野への挑戦を両立する (80:20)。
・他のメンバーや共同研究者を尊重し、一人では成し遂げられない研究成果を挙げる。
・学生含め、責任感のあるメンバーに失敗しても良いからチャンス・環境を提供する。

# Our Circumstance & Directions

# Members in FY2023

- **Professors (1 + ?)**
  - Kotsuki

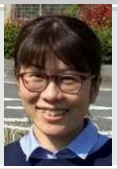
currently in review

- **Researchers/URA (6)**
  - Mao, Shiojiri, Muto, Zou, Pascal, Ohashi
- **Master 2nd Students (5)**
  - Saito, Seki, Fujimura, Sasaki, Kawasaki
- **Master 1st Students (2)**
  - Shimabukuro, Ketsuka
- **Bachler Students (2)**
  - Nakano, Shiraishi
- **Admin Staffs (4)**
  - Nakamura, Miyamoto, Okamoto, Noji

# (1) Research Projects

as of
Apr. 2023

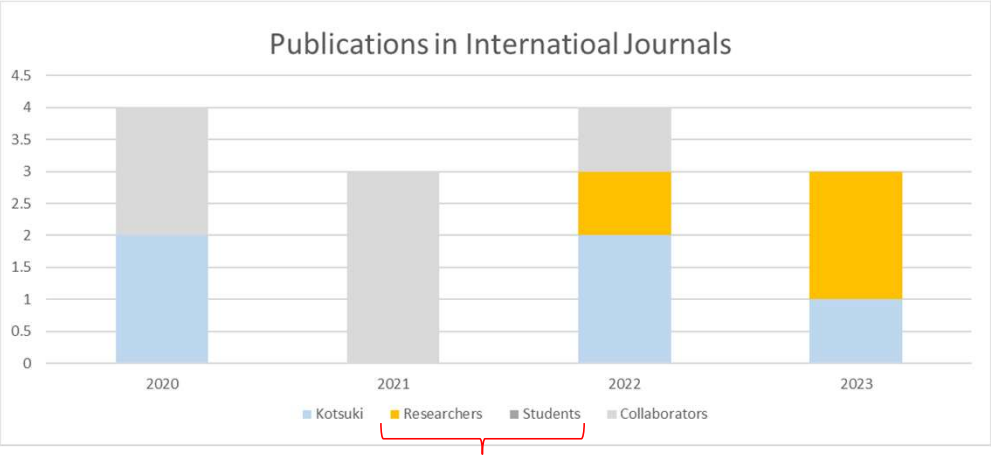
Environmental Prediction Science Laboratory

| Projects | Researcher | Students | Staffs |
|---|---|---|---|
| Moonshot | | | |
| Flood Prediction | | |  |
| Land (JAXA, Satreps) | | | |
| CHEZ WF | | | |
| Seasonal FCSTs | | | |
| SSP (JMA, JR) | | | |
| SCALE FCSTs | | | |
| Chiba Kujyukuri | | | |

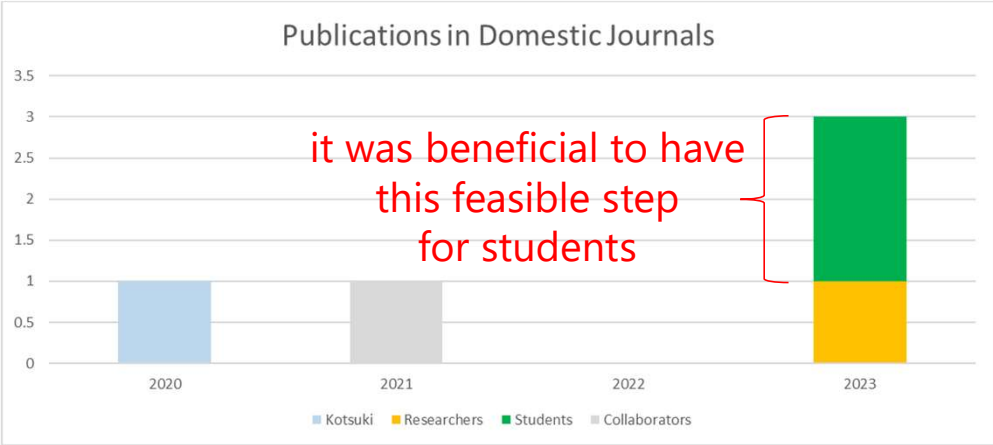
# (2) Achievements

as of 2023/04/05

Environmental Prediction Science Laboratory




we would like to increase




- **FY2022**
  - target: 10 submissions
  - results: 7 submissions (➔ 5 publications)
    - Kotsuki x2, Mao x2, Hu, Momoi, Oishi
    - & four awards (Fujimura, Shiojiri, Oishi, Saito)

- **FY2023**
  - target: 10 submissions & 10 publications
  - as of Apr. 2023

    maybe possible

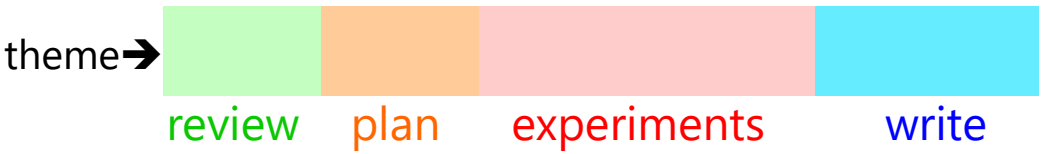
    relatively hard
    - in review: Oishi (SOLA), Mao (NPG)
    - in prep.: Muto (SOLA), Mao (GRL)

# Why Publications?

(1) to grow up through research

your research when B4

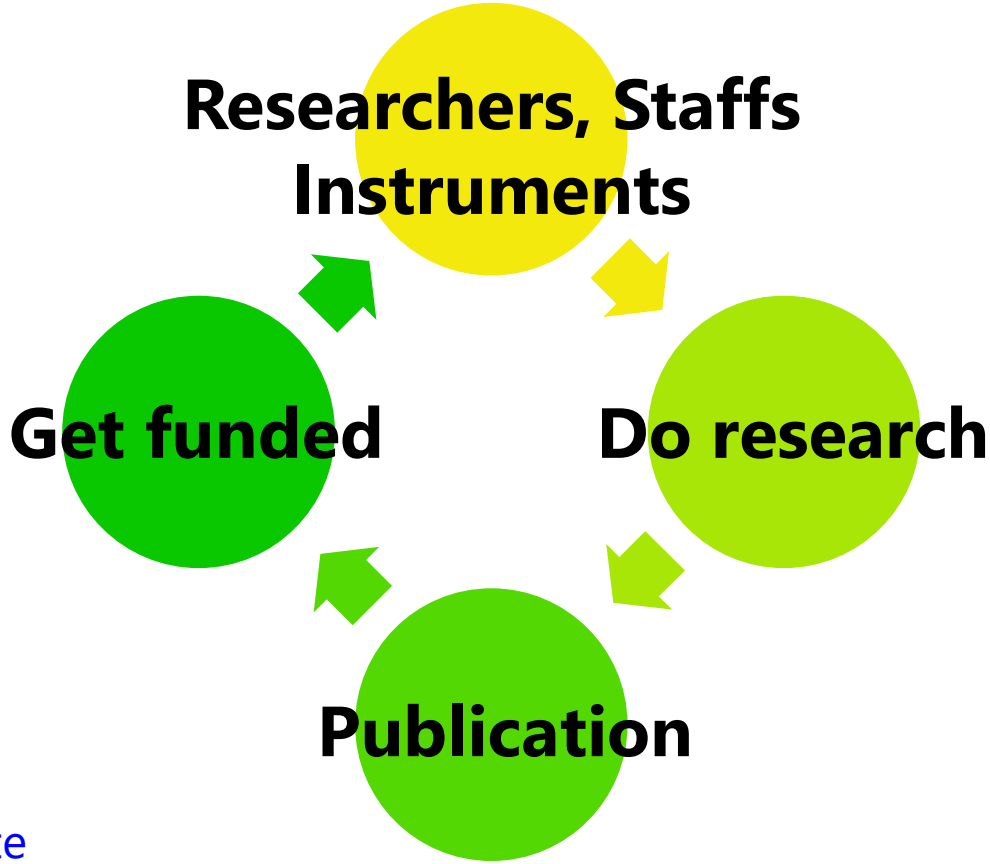
your research after writing




how I think now

experience on writing will change your eyes
how you see the world

(2) necessary to be stable group




w/o publications,
your outcomes just evaporate

# Theme of 4th Year

**4th Year: Deepening**
**深める**

**3rd Year: Start Integrating**
**融合の開始**

**2nd Year: Standardization**
**幹・文化の形成**

**1st Year: Foundation**
**土台固め**

# Our Actions for “Deepening”

# Meetings

Presentation: a conference-like presentation
mtg/discussion: you can skip introduction

- **(1) Entire Mtg. and Presentation (Eng.) @810**
  - every two weeks
  - administrative announcements & two presentations
- **(2) Students Mtg (Eng/Jpn) @806**
  - every two weeks
  - w/ advisor & Kotsuki
- **(3) Researchers Mtg (Eng/Jpn)@ 806**
  - every two weeks, 1-by-1
- **(4) Research discussion (Eng)@ 801**
  - every month, organized by Muto-san

One last thing I believe pretty beneficial is "research review / lecture" for surveying/studying.
It won't be mandatory for everyone. If you are interested in, let's discuss.

# Students' MTG

Shiraishi-kun will join
after determining theme

| Group | Students | Tech Staff | Advisor |
|---|---|---|---|
| Weather | Saito Fujimura | | Shiojiri |
| DA | Kawasaki Nakano | | Mao |
| Environment | Sasaki Ketsuka | | Muto |
| Disaster Risk | Seki Shimabukuro | Okamoto Nakamura | Shiojiri |

# Actions: Kotsuki

- To make myself bored and spend more time on scientific activities and educations

- How to produce time?
  - to decline unnecessary projects/meetings
    - I did my best
  - <u>to share information among members</u>
  - <u>to reduce unnecessary works</u>
  - <u>to make empowerment</u>
    - (1) Nakamura-san will handle the budget
    - (2) ???

# Actions: Researchers

Environmental Prediction Science Laboratory

deepen your research

- **to cycle hypothetical deduction (仮説演繹)**
  - to predict results prior to experiments
  - to handwrite a manuscript prior to planning research
- **better presentations for better feedbacks**
  - How to make presentations better?
    - (0) imagine audience, and consider take home message
    - (1) organize logically, and 3Cs (Clear, Correct, Concise)
    - (2) presenting not only results, but implications and hypothesis
  - in general
    - we should know telling “what we think” to other people is difficult
    - we should steal from others, and improve w/ try and errors
    - it is good to ask questions, and provide feedbacks to each other

then, what we will do?

- **to advance projects forward, and publication**

# Actions: Master/Bachler

Environmental Prediction Science Laboratory

## deepen your research

精神論

- **<u>観測と同化</u>**。「自分の研究」だけでなく「議論・論文・学会」機会を使う
  自分では解決できない問題を解決する。「自分の視野狭窄」を知る。
- **<u>質の前に量</u>**。基本的には、質を上げるには、研究の量が必要条件
  何事もそうだが、打ち込まないと、本当の楽しさは分からない
- **<u>学費の回収</u>**。先生ができる一番の教育は、一緒に英語論文を書くOJT
  Subjective ➔ Objective. 論文を書く=ロジカルプレゼンテーション

## go up to stairs steadily

Actions

### Step 1

**国内学会発表**

### Step 2

**日本語の論文**
(第一著者として)

- **土木学会 水工学論文集**
- **データサイエンス シンポジウム**

### Step 3

**国際学会発表**

- **AGU**; American Geophysical Union
  12月, 投稿8月
- **AOGS**; Asia Oceania Geosciences Society
  8月, 投稿2月
- **EGU**; Asia Oceania Geosciences Society
  4月, 投稿1月

### Step 4

**英語の論文**
(第一著者として)

# Messages to Staffs

Environmental Prediction Science Laboratory

## 7つの習慣より：第Ⅱ領域を意識しよう

| | 緊急 | 緊急でない |
|---|---|---|
| 重要 | **第Ⅰ領域**<br>• 締め切りのある仕事<br>• 切羽詰まった問題（予算）<br>• トラブル対応<br>• 監査 | **第Ⅱ領域**<br>• 準備、計画、予防策作り<br>• 仕事の結果を向上させる行動<br>• 人間関係作り<br>• 勉強や自己啓発<br>• リーダーシップ |
| 重要でない | **第Ⅲ領域**<br>• 突然の来訪<br>• 多くの電話<br>• 多くの会議や報告書<br>• 雑事 | **第Ⅳ領域**<br>• 待ち時間<br>• 意味のない行動 |

**第Ⅰ領域**

**第Ⅱ領域**

こうなりたい！

実行する主体性

**結果**

- 長期的な見通しが立てられる
- 緊急な問題対応が少なくなる
- 危機が少なくなる
- 人間関係が改善される

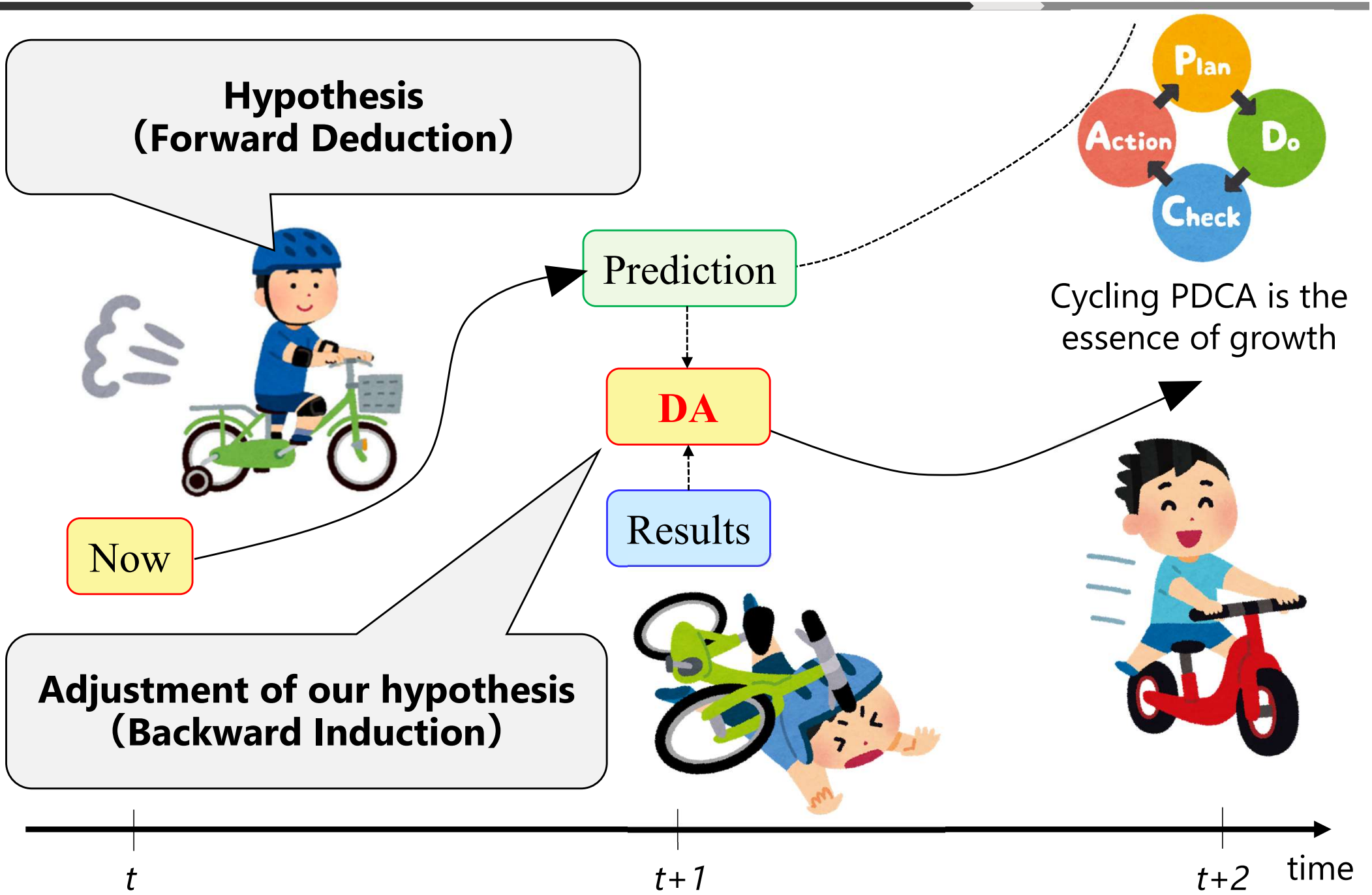
## 仕事の見える化・情報共有

- なぜ必要なのか
  - 落とし穴を防ぐ
  - 人を頼ったら済むことも多い
- Admin スタッフMTGの開催
  - 2週間に1回の目安

## やらないことを決める

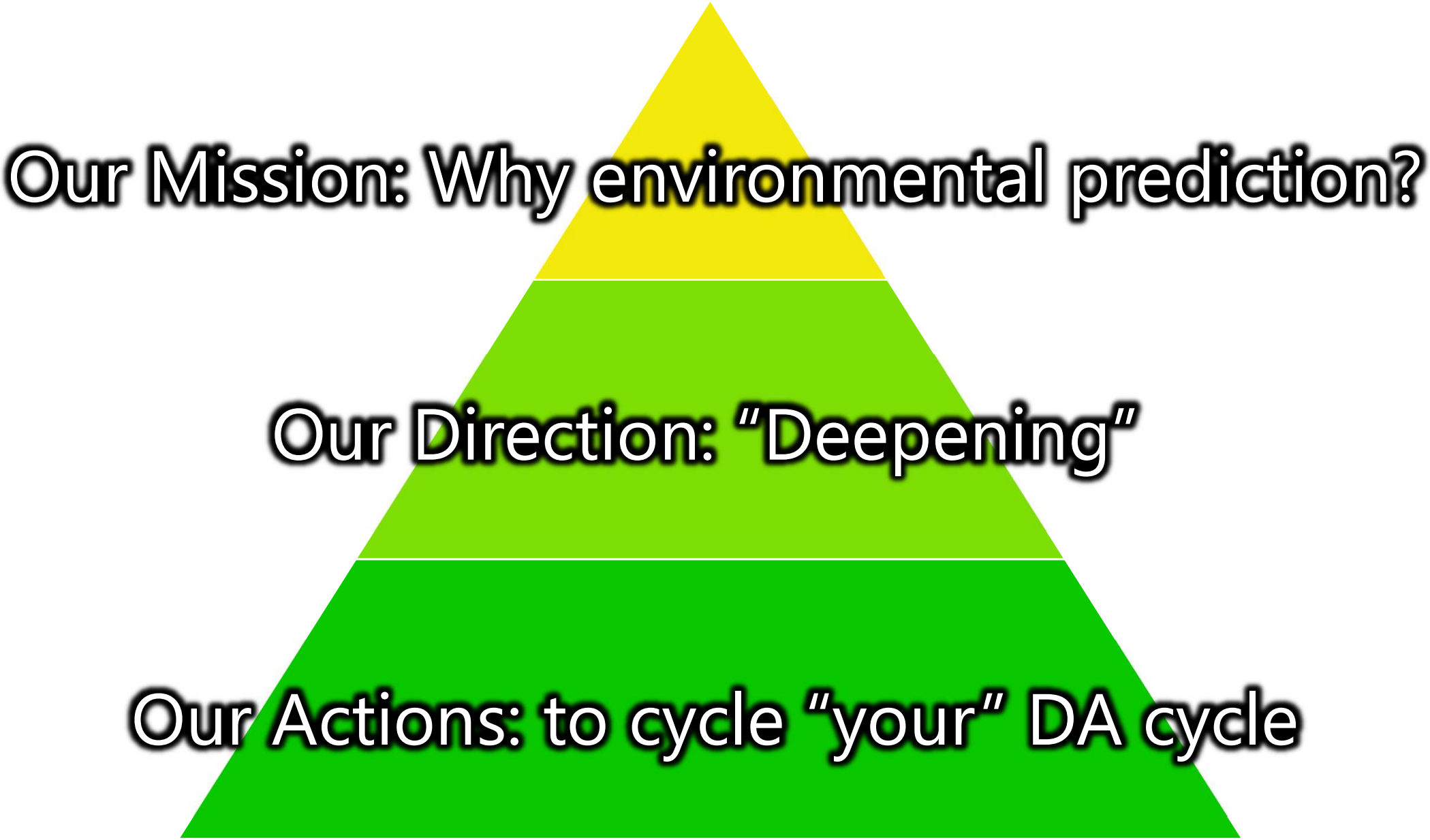
- 不要な仕組み・ルールだと思ったら、Adminスタッフで相談して、ぜひ意見を挙げてください

# Our Life is Data Assimilation



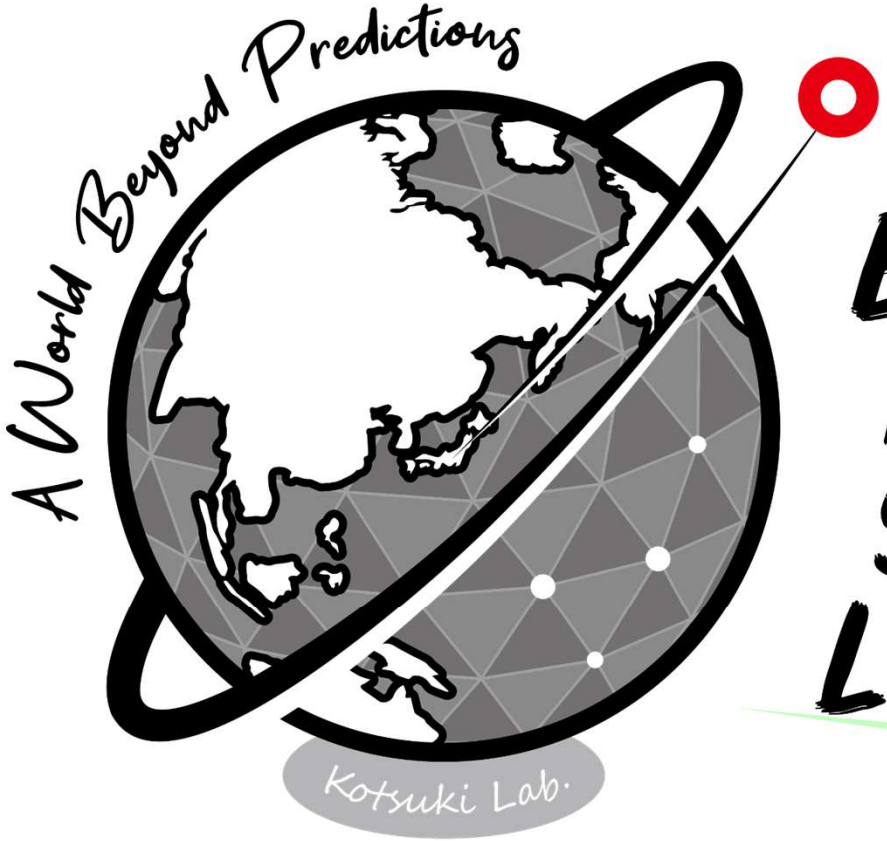
# Summary

# Today's Talk


Our Mission: Why environmental prediction?
Our Direction: "Deepening"
Our Actions: to cycle "your" DA cycle

# Appendix

# A World Beyond Predictions




**Growth, Breakthrough, Attractor, Satellite, Prediction**

**Environmental Prediction Science Laboratory**

**Real and Virtual Earth Computation, Model, DNN**

1. Create new science/knowledge beyond “predictions of the world”
(世界の想像を超える技術・知識を創造する)

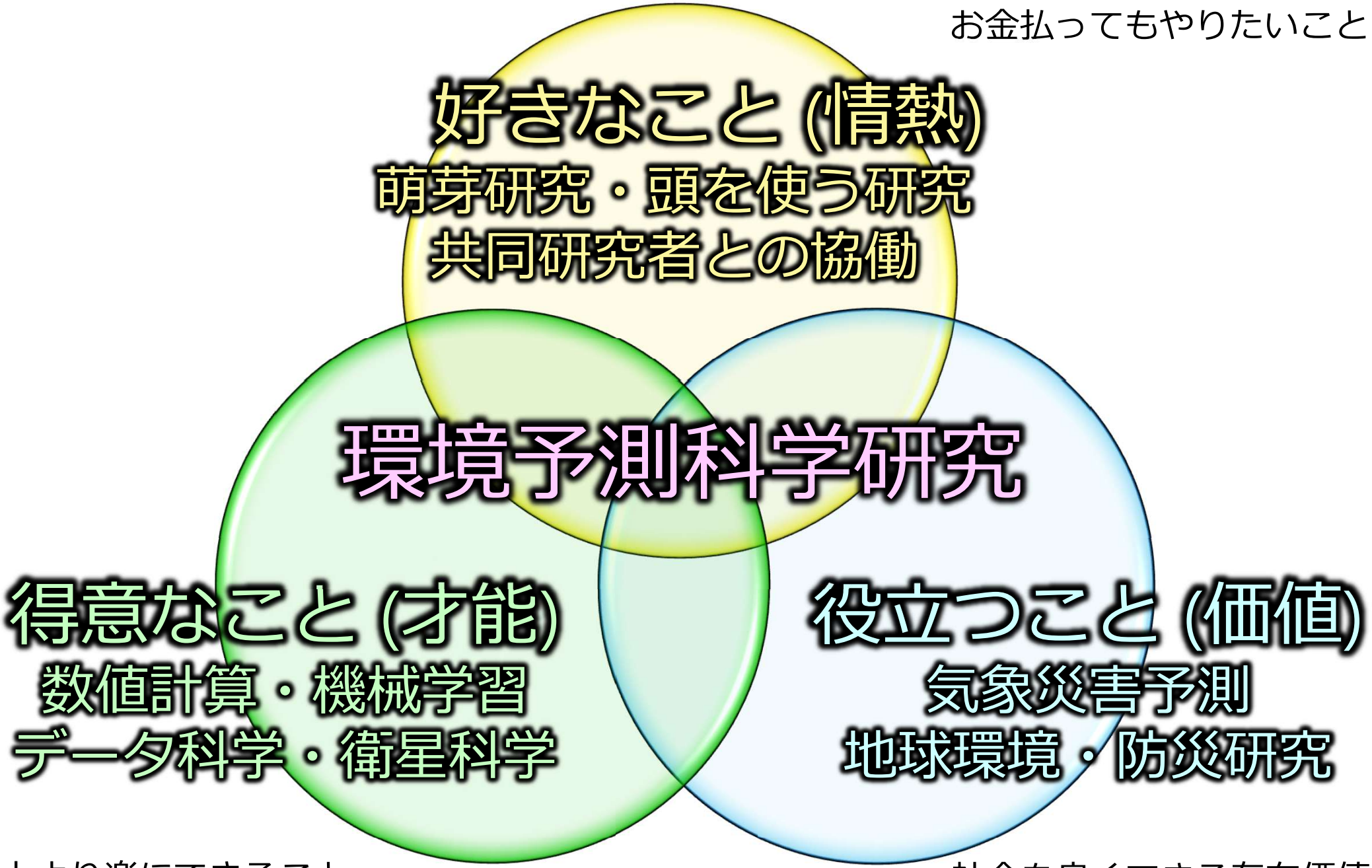
2. Grow up beyond “our own predictions” through collaborations
(協働で自身の想像を超える = 俺/私はこんなことできたのかぁ)

*many thanks to Iizuka-san*

# 世界一を目指す分野

Environmental Prediction Science Laboratory

お金払ってもやりたいこと




人より楽にできること

社会を良くできる存在価値