

## 【Grant-in-Aid for Transformative Research Areas (A)】

### Section I



## Title of Project : Integrated Sciences for Sustainable Human-Aqua Environment

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#### 【Purpose of the Research Project】

The hydrosphere environment, which is essential for life, is constantly subject to “fluctuations” caused by a variety of internal and external factors, such as climate change, ecosystem transition, and changes in social conditions related to water. As the range of these “fluctuations” increases, human society and ecosystems will be greatly affected by frequent weather disasters, water resource conflicts, and loss of biodiversity. Reducing these water crises and risks, and realizing a society where water, humans, and creatures can coexist in a sustainable manner, is an internationally important issue. In this Research Area, we consider the hydrosphere environment as a “water cycle system” established by the interaction of the geosphere, biosphere, and anthroposphere. We aim to create a new academic area, “Aqua Science,” with the main objective of elucidating the historical transition and current dynamics of the balance among these three spheres, exploring ways to solve social issues related to the water environment in line with local conditions, and proposing a vision for the future.

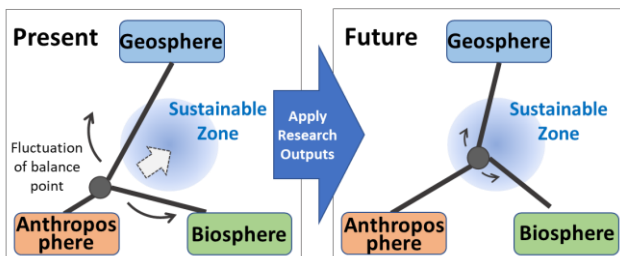


Figure 1 The Goal of Aqua Science

#### 【Content of the Research Project】

There are four research plans under three Research Groups targeting the geosphere (A), anthroposphere (B), and biosphere (C) in this Research Area. Planned Research A01 is to create information to understand the interaction between the geosphere, biosphere, and anthroposphere dynamically from the viewpoint of the water cycle based on the measurement and analysis of information on water and the surrounding environment, and to develop an information translation approach necessary for utilizing the information in other Planned Research. Planned Research B02 is to dynamically clarify the fluctuation of the water cycle system from the past to the present from the viewpoint of social culture and history, and to extract the socio-cultural factors that should be protected or modified in order to create a desirable water symbiotic society. Planned Research B03 will empirically analyze, from the standpoint of economics, what kind of water use methods are suitable for realizing healthy and prosperous lives in regions where water resources are scarce and water

infrastructure is poor, and what kind of management measures and systems are necessary to conserve and improve the water environment to explore the ideal form of sustainable water resource governance. Planned Research C01 will assess the health of the basin ecosystem system by investigating the characteristics of the ecosystem and biodiversity that form the basis of the “basin sphere” where the natural environment surrounding water and human society and culture coexist to explore ways to conserve, restore, and sustainably use the water cycle system in ecosystems.

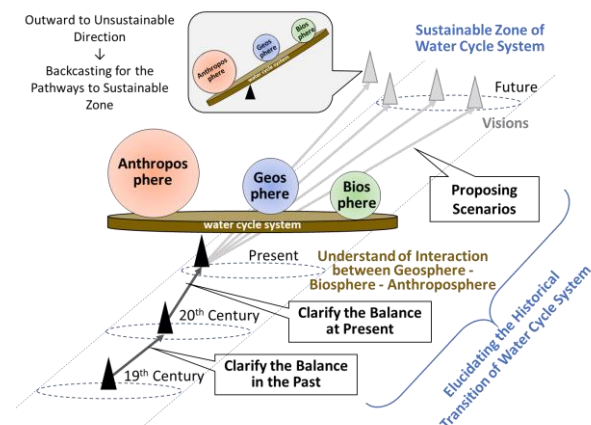


Figure 2 Conceptual Diagram of Aqua Science

#### 【Expected Research Achievements and Scientific Significance】

The creation of Aqua Science is expected to provide concrete measures to reduce water crisis and water risk, and to make the water circulation system sustainable. In addition, the approach of Aqua Science, in which different disciplines work together to solve problems, can be applied to the analysis of other problems and risks facing the world today, and to the creation of visions that lead to solutions. Furthermore, the promotion of this research field including its Publicly Offered Research will lead to the development of young researchers, the formation of a researcher network, and the discovery of new research themes.

#### 【Key Words】

Water cycle system: The hydrosphere environment established by the interaction of the geosphere, biosphere, and anthroposphere

【Term of Project】 FY2021-2025

【Budget Allocation】 705,800 Thousand Yen

【Homepage Address and Other Contact Information】

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