71 Differences in the desired environments for marine and coastal recreational spots: an analysis of user valuation at travel- review websites

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Introduction

Marine and coastal ecosystems have provided us with various recreational services such as beach recreation, recreational fishing, and aesthetic or spiritual spots. These recreational services have attracted attention in recent years from the viewpoint of improving psychological human well-beings as well as providing economic values through sightseeing and recreation. However, quantitative evaluation of recreational services provided by seascape is not enough. In this research, I constructed the statistical model to reveal the relationship between environments and marine and coastal recreational values evaluated by a user valuation at travel-review websites. Then, I applied this model to future climate and demographic changes to assess future threat to recreation services in Japan.

Materials and Methods

I calculated the values for each recreational service at each site as the number of comments weighted the valuation (zero to five) by users at travel-review websites. To evaluate what environmental factors may affect the value, I constructed a spatially varying coefficient modelling using the environmental variables (population, accessibility to recreational sites, volume of accommodation, sandy coast, protected area, COD, number of endangered species) accounting for spatial autocorrelation. This
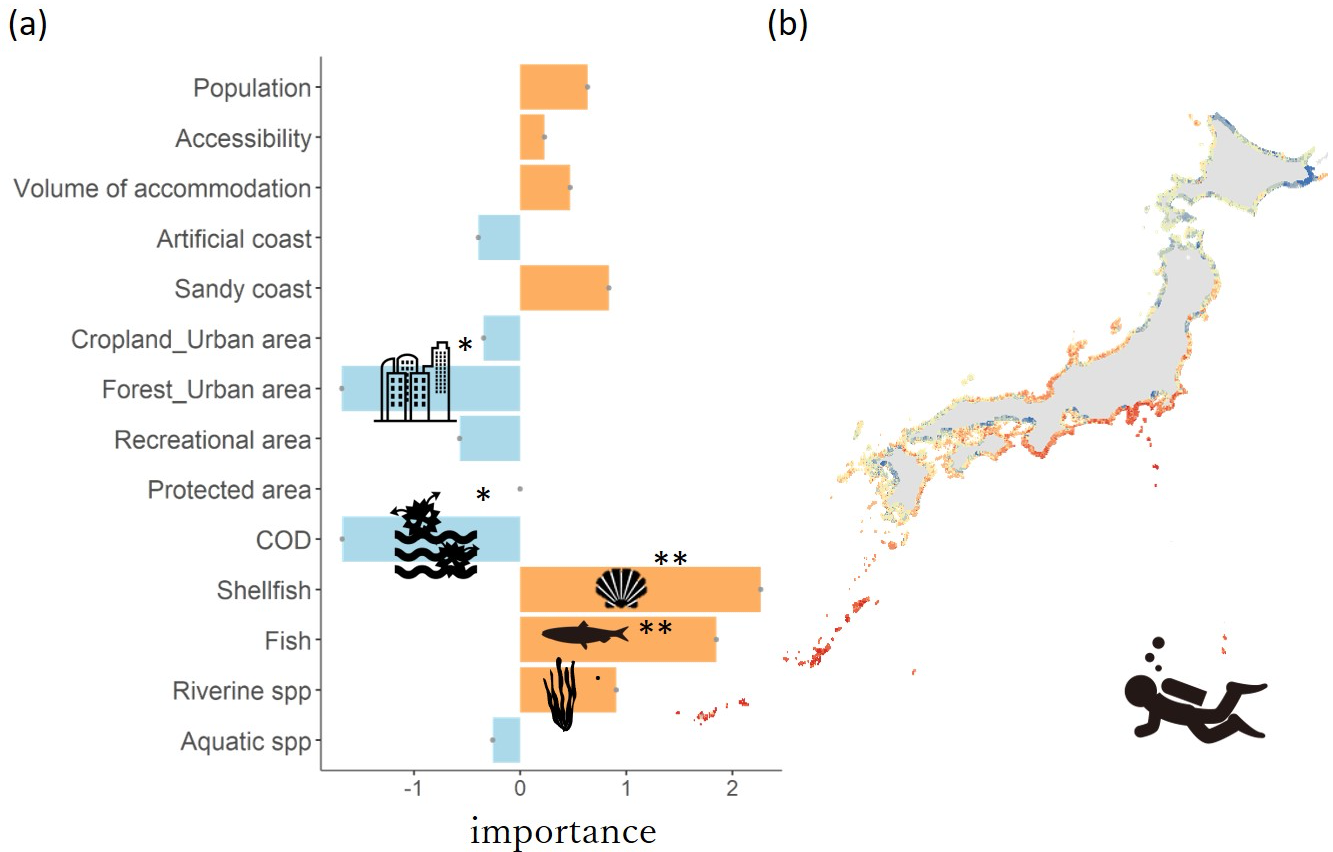
(a)

(b)

Figure1 (a) The importance of environmental variables on the recreational values. (b) the spatial estimation of values for diving spots. Red color indicates high recreational value while blue color does low.

modelling approach considers the difference in spatial coefficient structures of environments using random effect eigenvector spatial filtering with the "spmoran" package in R (Murakami, 2017; Murakami and Seya, 2019). I adapted this method to represent spatial autocorrelation of our data, which may cause inaccuracy of the parameter estimation in models (Griffith and Peres-Neto, 2006). For scenario analyses, I adopted several hypotheses (representative concentration pathways, resilience on natural capitals, demographic distribution pattern) to represent future threats on coastal environment in Japan.

Results and Discussion
As a result, beach recreation sites had not only plain sandy landscapes but more accommodation facilities in the surroundings, whereas diving spots were not necessarily located in environments with lots of accommodation facilities (Fig. 1a). In addition, the diving spots tended to be the refuges for endangered aquatic species. For future scenarios, the western parts of Japan would have larger beach loss, indicating the future loss of recreational values there (Fig. 1b). However, other spots such as aesthetic sites showed that the values would be relatively higher in the northern part. These results implied the necessity of regional strategies for sustainable use of recreational values. Further study of the conflicts and synergies among recreations would be beneficial to propose an integrated adaptive management strategy under future scenarios.