

II 次の文を読んで、問いに答えなさい。

At the southern tip of the Maldives, on the tiny island of Villingili, part of the land rises up to 2.4 metres above the sea. It's the world's lowest high point. With most islands just a metre or so above the sea level, it is often suggested that the world's lowest country may drown beneath rising sea levels by the end of the century. For tourists, this ranks the Maldives at the top of lists of destinations to visit before they disappear. For the 400,000 people who live on the islands, things are rather more serious: rising sea levels could make them climate change (A). Such scenarios of flood and drowning assume that the land surface remains unchanged. But, what if the land could build up vertically as sea levels rise? This is what colleagues and I have been examining in our research, now published in *Geophysical Research Letters*. We studied five reef islands in the southern Maldives and found that they were actually built up when sea levels were higher than they are today.

The Maldives is a nation of around 1,200 coral reef islands. Reef islands are unique landforms in that they are formed entirely of sediments¹ produced by corals and organisms that live on coral reefs in the surrounding waters. (B), this dependence on the coral reef for island-building sediments, combined with elevations² rarely more than a few metres above the sea, means that reef islands are often considered among the environments most vulnerable³ to climate change, particularly to sea level rise. This is of particular concern for nations such as the Maldives that are built entirely on reef islands, and whose citizens have nowhere else to go.

To improve predictions of how reef islands may respond to future environmental change, it is important to understand how they responded to environmental change in the past. (C), we reconstructed the island-

building histories of five islands in the southern Maldives. We first collected 28 reef island sediment samples, or cores. This basically involved hammering an aluminium pipe into the reef island until it reached the island “foundations”—a point lower than the live coral in the surrounding ocean. The cores enabled us to access the layers of sediment that have built up throughout the island’s history. We then analysed these sediments under the microscope to find out what exactly the island is made of. In addition, we radiocarbon dated⁴ the sediments to determine when the various layers were created.

Results showed that the key phase of reef island building occurred between 4,200 and 1,600 years ago, when sea levels reached around 0.5 metres higher than they are today. In addition, this was probably happening under the influence of large wave events caused by distant storms. These waves would have had the power to break pieces of coral off the reef. (D), these pieces of coral, as well as sand from the reef, built up to form the islands. Climate change will mean rising sea levels and even stronger large wave events in the future. It may therefore recreate conditions that are conducive to⁵ reef island building, which may enable these islands to keep growing vertically. This would make the islands more resilient⁶ and may even be necessary for them simply to (E) rising sea levels. Our work complements⁷ other studies which are showing that islands are in fact dynamic landforms that are able to move and adjust in response to environmental change.

All this should make reef islands in the Maldives more physically resilient. However, (F) can also make islands more difficult for humans to live on, for instance by damaging houses and farmland, or by dumping salt into supplies of fresh water. Reef island nations will have to develop infrastructure⁸ that can resist, or be adaptable to, such powerful waves. Such infrastructure must still allow natural processes to take place,

however, so that reef islands can maintain active connections to their surrounding coral reefs.

While our study suggests that rising sea levels could benefit reef islands in some regards, they still remain at risk. For instance, we also found the islands in our study were made mainly of coral — about 75%. This means a healthy reef will be essential if the islands are to keep growing in future, and the Maldives are to remain above the waves. (G), coral reefs are threatened by climate change, not just by rising sea levels, but also by warmer and more acidic⁹ oceans. Under climate change, we may therefore end up in an odd situation where we have the perfect conditions to build coral reef islands, but (H) of building materials.

(Adapted from a work by Holly East)

(注)

- | | |
|---------------------|----------------------------|
| 1. sediment | 沈殿物, 堆積物 |
| 2. elevation | 隆起 |
| 3. vulnerable | 被害をこうむりやすい |
| 4. radiocarbon date | 放射性炭素年代を測定する |
| 5. be conducive to~ | ~に貢献する, ~を促す |
| 6. resilient | 強い, 回復力のある |
| 7. complement | 補足する |
| 8. infrastructure | (道路, ダム, 堤防などの) 基盤設備, インフラ |
| 9. acidic | 酸性の |

[1] 本文の (A) ~ (H) それぞれに入れるのに最も適切なものを(1)~(4)から一つ選び、その番号を解答欄にマークしなさい。

- (A) (1) researchers (2) supporters
(3) tourists (4) victims
- (B) (1) After that (2) However
(3) Similarly (4) To make matters worse
- (C) (1) Furthermore (2) Needless to say
(3) On the other hand (4) With this goal in mind
- (D) (1) A few years ago (2) All of a sudden
(3) Over time (4) Previously
- (E) (1) keep pace with (2) make space for
(3) prevent (4) reflect
- (F) (1) constant growth (2) coral reefs
(3) large waves (4) such resilience
- (G) (1) And yet (2) Fortunately
(3) Indeed (4) Instead
- (H) (1) a collection (2) a waste
(3) an absence (4) the existence

[2] 下線部 ㉞～㉟ それぞれの意味または内容として、最も適当なものを(1)～(4)から一つ選び、その番号を解答欄にマークしなさい。

㉞ this

- (1) the island rising up in the Maldives
- (2) the Maldives being the world's lowest country
- (3) many islands in the Maldives being just a metre or so above the sea level
- (4) the Maldives being likely to disappear under the sea by the end of the century

㉟ This

- (1) The fact that climate change can negatively influence reef islands
- (2) The fact that there are around 1,200 coral reef islands in the Maldives
- (3) The fact that sediments produced by organisms make reef islands more livable
- (4) The fact that people living in nations like the Maldives have nowhere else to go

㊱ Results

- (1) Results from examining whether the Maldives are built entirely on reef islands
- (2) Results of predicting how reef islands may respond to future environmental change
- (3) Results from investigating the influence of large wave events on reef islands in the Maldives
- (4) Results of reconstructing the island-building histories of five islands in the southern Maldives

㊦ It

- (1) The reef
- (2) Climate change
- (3) The islands' history
- (4) The key phase of reef island building

㊧ Our study

- (1) The study of the declining tourism of the Maldives
- (2) The study of how reef islands evolved in the Maldives
- (3) The study of the impact of coral reefs in the Maldives on humans
- (4) The study of materials which could be used to repair reefs in the Maldives