

平成 20 年度（2008 年度）

東北大学大学院理学研究科 地学専攻

博士課程前期 2 年の課程 入試問題

英語

平成 19 年 8 月 30 日 9 : 00 ~ 11 : 30 実施

注 意 事 項

1. 机の上には受験票、筆記用具、時計以外は置いてはいけません。
2. 合図があるまで問題冊子を開いてはいけません。
試験時間は 9 : 00 から 11 : 30 までです。
3. 問題は I、II、III の 3 問で、受験者全員に共通の問題です。
4. 解答はすべて解答用紙に記入します。解答は大問 1 題毎に 1 枚の解答用紙を使います。表に書ききれないときは裏を使います。解答用紙の所定の欄に受験番号・氏名・志望分野および問題番号を記入します。

問題 I 次の英文を読み、問1～問4に答えよ。

In future, it is very likely that not only high flows and floods but also low flows and droughts will play an increasingly important role, especially if more irrigation is required for food production in the dry season (for high-yield rice to feed a growing population). Living with droughts could become as challenging as living with floods. Considering the most recent report of the Inter-governmental Panel on Climate Change (IPCC 2001), such extreme scenarios are not (1). Based on an Atmosphere-Ocean Circulation Model, two scenarios were evaluated for predicting precipitation changes up to 2050 and their consequences for annual average discharges. For the Himalayas and the Indo-Gangetic Plain, one scenario predicts an increase, the other a decrease, in precipitation. The first scenario could mean more floods, the second more droughts. Accordingly, coming decades will be characterized by uncertainty, and the scientific community has a responsibility to communicate, in a careful and timely manner, information about any types of change or variation, (2) for this most sensitive part of the developing world.

With the currently available technical knowledge, human activities as well as natural processes can change river systems and water regimes. The (a) “River Link Mega Project” in India is an impressive example, even though for the time being it is only a theory. (b) In a situation of increasing drought conditions and critical food production in India, however, it could very quickly become a realistic option. Transferring water from the Brahmaputra and the Ganga to southern India, linking 37 big river systems, by constructing 32 dams and 9,600 km of canals and water carriers (Imhasly 2003), would change all these river systems dramatically. This concept may show that we have reached the point where the human impact on the natural hydrological system will be much bigger than any (3) climatic or environmental change. If there should be any doubt about the possibility of such human impact, then we only have to consider the South-to-North Water Transfer in China, which is under construction.

Water resources are fundamental for development, from the level of the

farmer to the level of a whole country. Water conflicts are and will be unavoidable, and solutions will be possible only through cooperation, be it on a (4), national or international level, and development will be possible only with amicable arrangements about the use of water resources. For the whole Brahmaputra-Ganga-Meghna basin, we should keep in mind the words of Lonergan (2005), published in UNEP's Our Planet: (c) “If there is a political will for peace, water will be no hindrance. If you want reasons to fight, water will give you ample opportunities.” Along the same lines, International Mountain Day 2004, with the theme “peace on high,” was dedicated to cooperation and to reducing conflicts – both of which are important preconditions for (5) mountain development.

(T. Hofer and B. Messerli eds., “Floods in Bangladesh,” United Nation University Press, 2006 より一部改変)

参考: irrigation 灌漑, precipitation 降水量, discharge 流出, Brahmaputra ブラマプトラ川, Ganga ガンジス川, Meghna メグナ川, amicable 友好的な, UNEP 国連環境計画, hindrance 障害物

問1 文中の(1)～(5)に該当する適切な語を下の①～⑩の中から選び、番号で答えよ。

- ①believable ②unrealistic ③local ④absolutely ⑤global
⑥sustainable ⑦especially ⑧natural ⑨exploitative ⑩economic

問2 下線部(a)のProjectの内容について説明せよ。

問3 下線部(b)を和訳せよ。

問4 下線部(c)を和訳せよ。

問5 英文に適切な英語のタイトルを付けよ。

問題Ⅱ 次の英文を読み、問1および問2に答えよ。

(a) Benjamin Franklin (1706-1790) was one of the most eminent men of his time. During his stay as ambassador of the United States in France, he noted that both the people of Europe and the US become agitated by the coldest winter in memory. A blue, cold and, as Franklin emphasized, dry fog, which could not be dissolved by the sun's rays, had started to cover the northern hemisphere in the summer of 1783. As far as we know, Franklin was the first scientist who related the blue fog and the dramatic deterioration of climate to volcanic eruptions. He was thinking of Hekla volcano in Iceland, but this time the most famous volcano of Iceland was not the source for the fog. (b) Hekla was by the way interpreted as being the entrance to hell in medieval times and may have been on the mind of Jules Verne as the gate in Iceland through which his hero, Professor Dipenbrock started his journey to the center of the Earth and Snaefellsness volcano. In June/July 1783, about 12.5 km³ basaltic lava had erupted from a large fissure in Iceland, the Lakagir fissure, but only 0.7 km³ tephra was generated. (c) Three quarters of the animals on Iceland (200,000 sheep, 30,000 horses, 10,000 cattle) died, apparently due to fluoride-poisoning from the fluorine-rich gases and ash deposited on the pastures, as well as starvation because of the lack of feed. These effects probably lingered, due to the volcanic haze-induced deterioration of climate. About 10,000 people died in the resulting famine, one fifth of the population of Iceland. While Franklin wrote a scientific essay on the problem, newspaper in the summer 1783 across Europe were full of the speculations on volcanoes to be the source of the foul smelling air and depressing atmosphere. One newspaper in Germany even made up a story of an erupting volcano southeast of Frankfurt being the source of the oppressive weather. (d) The flooding of central Europe in the summer of 1784 due to incessant rain was the worst in the past 1,000 years most likely the aftereffects of the Laki eruption a year earlier.

(H. U. Schmincke, "Volcanism," Springer, 2003 より)

参考: deterioration 悪化, Snaefellsness volcano アイスランドの火山名, basaltic lava 玄武岩質溶岩, cattle 牛, fluoride フッ化物, starvation 餓死, linger ぐずぐずする, oppressive 過酷な, incessant 絶え間のない

問1 上の文章のうち下線部(a)～(d)を和訳せよ。

問2 1789年におきたフランス革命は階級対立などの歴史的視点でその発生が説明されている。しかし一方では、アイスランドのラキ(Laki, Lakagir)1783年噴火が革命発生の遠因になった、との説もある。遠因説が正しいとした場合、上記文章の内容を参考にしたうえでその機構を推定し、5行程度でまとめて説明せよ。

問題Ⅲ 次の日本語を英訳せよ。

生態学とは植物や動物と、周囲の環境との関係を研究する科学である。

この用語は、1866年ドイツの科学者Ernst Haeckelによって最初に使われた。彼は動・植物の生き残りは、すべての生物と、気温、湿度、光、水、土壌などの外的要因などの環境との相互関係により決められるということを考えた。

最近になり、生態学は汚染から自然を守る学問として認識されるようになった。私達は今、生物と、それをとりまく環境との関係をエコシステムという基本単位でとらえるようになった。エコシステムは、小さくて単純かもしれないし、大きくて複雑かもしれない。その中で共通していることは、エコシステムの中で、植物と動物は非常に密接に関係しあっているという事実である。

参考： 生態学 ecology, エコシステム ecosystem