

## Chapter 19

# Nature in the Islands of Kagoshima

Kei KAWAI

### 1. Introduction

In the section on nature, five researchers introduced the topics of biological diversity, volcano topography, the Kuroshio Current, insect fauna, and fossils with regard to the islands of Kagoshima. Herein, I will explain these summaries first. Secondly, many studies have been conducted in the islands of Kagoshima covering topics other than the ones mentioned above. However, many of these reports were written in Japanese, and therefore, they are not readily accessible to an English-speaking audience. I examined one database (CiNii Articles) to find Japanese articles on the islands of Kagoshima. The main topics I discovered, which I will introduce herein, are typhoons, disasters, the Tanegashima Space Center, and solar eclipses.

### 2. Summary of the section on “Nature”

A variety of creatures and environments can be found in the islands of Kagoshima, which stretch southwest from Kagoshima. The warm Kuroshio Current that flows from the south to the north contributes greatly to this diversity. NAKAMURA described the Kuroshio Current. There are many volcanic islands in the Nansei Islands, and some of the volcanoes are active. KINOSHITA explained the state of the volcanoes of Kagoshima. Natural conservation is essential because certain endemic species, such as the Amami black rabbit, inhabit the Amami Islands, and because of the beautiful, highly diversified natural environments that exist there. OKANO explained the biodiversity in the Amami Islands. Many animals can be found in the islands of Kagoshima. Surprisingly, insects are particularly abundant. SAKAMAKI reviewed the variety of insect fauna. Occasionally, fossils have been found in the islands of Kagoshima, and they provide clues as to the state of that region ages

ago. NAKAYA described the diversity of fossils in Kagoshima.

### 3. Solar eclipse

A solar eclipse was observed in Japan on July 22, 2009. The eclipse could be seen from the southern part of Yakushima Is., Tanegashima Is. to the northern part of Amami-Oshima Is. Akuseki-jima Is., which is in the Tokara Islands, was the most ideal place to observe this eclipse. Because these small islands are sparsely populated and have few accommodations, authorized tours were arranged and the number of tourists was limited during the solar eclipse period. The residents and the local government of the island made preparations to welcome observers of the eclipse.

A satellite observation was made of the eclipse (OHKI 2009), and the special features of the event were presented in a general science magazine (Newton 2009). This eclipse was also studied in local schools (*e.g.*, MAEDA 2010). SEKI (2010) studied how the solar eclipse affected the bird-song in the area. The frequency of calls or songs averaged 16.4 per minute on ordinary days, with a large variation occurring between days or locations, and there was no silent period that lasted longer than two minutes. During the dark period of the eclipse, however, no diurnal birds sang or called in the study sites for 7 min 49 s on average.

### 4. The Tanegashima Space Center

The Tanegashima Space Center was established in 1969 in the southern part of Kagoshima Prefecture, along the southeast coast of Tanegashima Is., when the original National Space Development Agency of Japan was formed. It remains the largest rocket-launch complex in Japan (9,700,000 m<sup>2</sup>).

KAGUYA was launched by an H-IIA launch

vehicle on September 14, 2007 from Tanegashima Space Center (MINAMINO *et al.* 2009). The purposes of KAGUYA are to obtain and analyze scientific data on the origin and formation of the moon. The Whale Ecology Observation Satellite (WEOS) was launched into an 800 km high sun synchronous orbit on December 14, 2002 from Tanegashima Is. by an H-IIA-4 vehicle (HAYASHI *et al.* 2005). Satellites launched from Tanegashima Space Center were used for many other scientific purposes as well.

## 5. Natural disaster

The climate of the Amami district is oceanic and subtropical; snow does not fall there and the average air temperature is 21.6 °C. Humidity is high and the average annual rainfall is approximately 3,300 mm. Natural disasters have an impact on the natural environment, social system, and economy of the islands.

The islands are in the path of typhoons from early fall through the summer, and six to seven times a year they are subjected to an intense typhoon. The area has been dubbed “typhoon Ginza” because of the frequent occurrence of typhoons. One of the most damaging of these storms was the second Muroto typhoon that passed through Amami district in 1961. About 10,000 dwellings, most of which were flimsy wooden houses, were severely damaged, and a third of these were completely destroyed (FUKUSHIMA *et al.* 1962, TATEKAWA 1963). It has been reported that in order to combat the effects of typhoons in this area, the method of fruit cultivation in plastic greenhouse is popular now (HIDAKA 2006). There was also a paleoenvironmental study done to examine the influence of typhoons on 1,000-year-old Yaku cedar trees (MANABE and KAWAKATU 1968).

The massive tsunami that struck the Tohoku district on March 11, 2011, is still fresh in everyone’s memory. Amami has experienced such tsunamis many times. For example, the M8 Kikaijima Is. earthquake of 1911 resulted in a huge tsunami that struck Amami (HASHIMA 2002).

The Amami district came under the influence

of heavy rainfall on October 20, 2010. This rain caused a landslide that impacted all of Amami-Oshima Is., and the sand slide influenced the shoreline in a variety of ways. According to newspaper reports, a huge amount of sand flowed into the Sumiyou tidal flat, devastating the fish there. Three people died in this disaster, and many houses suffered damage. Of these, 10 houses were completely destroyed, 475 were partially destroyed, 123 were inundated with water above floor level, and 153 were inundated with water below floor level. Kagoshima University reported several types of influences from this disaster on both the natural environment and the people (Kagoshima University 2012).

## References

- FUKUSHIMA, M., TACHIKAWA, M., YOSHINO, S. and KUME, K. 1962. On the damage to houses from typhoon Daini-Muroto in Amami-Gunto. Res. Rep. Fac. Engin. Kagoshima Univ., 129-139.
- HASHIMA, T. 2002. Scale of Tsunami in 1911. Tsunami Engin. Tech. Rep., 19: 45-51.
- HAYASHI, T., OKAMOTO, Y., YOKOYAMA, K., HOSOKAWA, S., TOMITA, H. and MASUMOTO, Y. 2005. Whale Ecol. Observ. Satell. Syst. Appli., 105: 13-20.
- HIDAKA, T. 2006. Tropical and Subtropical Fruit Production in the Ryukyu Islands, Japan. Kagoshima University for the Pacific Islands, Occas. Paper. 46: 125-133.
- Kagoshima University 2012. Research report about heavy rain disaster in Amami 2010. 185 pp., Kagoshima. (in Japanese)
- MAEDA, T. 2010. Total solar eclipse at July 22 2009 in Kagoshima Prefecture, Japan. Kagoshima Prefect. Muse. Rep., 29: 81-85.
- MANABE, D. and KAWAKATU, K. 1968. Chronological Investigations on the Annual Ring and Typhoonic Patterns of the Yakushima Cedar. The Rep. Kyushu Univ. For. 20: 127-167.
- MINAMINO, H., MAEJIMA, H., NAKAZAWA, S., IKEGAMI, S., and MATSUFUJI Y. 2009. The development of KAGUYA : The evaluation of KAGUYA on-orbit data. IEICE Tech. Rep. 1-6.
- Newton 2009. 2009.7.22 Solar Eclipse. 29: 78-87.
- OHKI, M. 2009. Satellite Observation of the Umbra of the Moon during the Total Solar Eclipse on July 22, 2009. J. Rem. Sens. Soci. Jap., 29: 595-596.
- SEKI, S. 2010. Unusual avian vocal behavior during the total solar eclipse in the Tokara Islands, southern Japan. Bird Res., 6: A1-A11.
- TATEKAWA, M. 1963. Small geographical features and storm damage: a case study of typhoon Daini-Muroto in Amami Islands. J. Env. Engin., 12: 169-176.