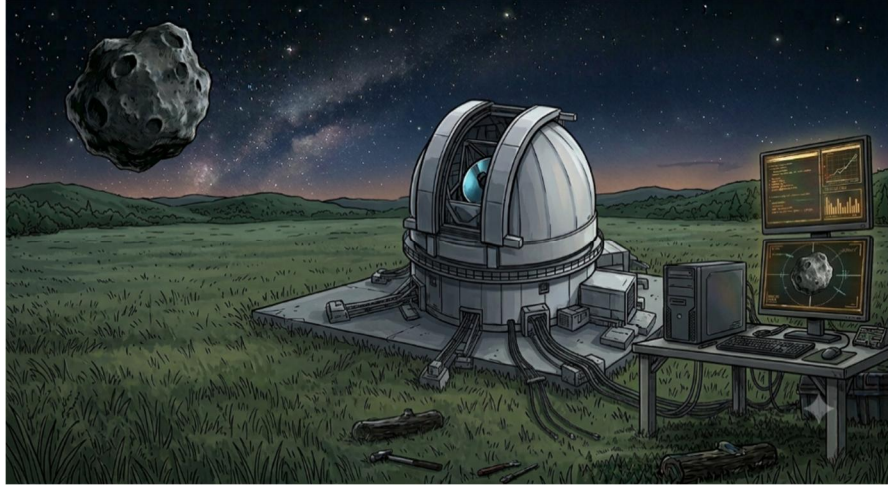


My Journey into Asteroid Research

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(The image generated by Google Gemini)

What do you imagine “the universe to be”? Some people imagine the accelerating expansion of the universe or the beautiful spiral galaxy. In fact, many scientists focus on the very distant universe. There are many kinds of unknown phenomena not only in deep space but also on our planet.

I now major in astronomy but also study Earth and Planetary Science. So I’ll describe why I chose this path by looking back on my school days.

I have had many science activities between the ages of 12 and 18. There was a kind and passionate teacher. She was the person who had influenced me the most. There’s no doubt that I decided my future path with her. She taught biology as well as chemistry, although she had conducted research in biology during her university years. I took her classes for 4 years, until I decided to learn not biology but physics. In

her science class, our students did many experiments. For example, we performed a flame test, which revealed different colors when burning various metals. This color change mechanism is difficult for me, but it is fun. In addition, she led the fieldwork. I went to Awaji Island for its activities. I gathered kinds of seaweed from the ocean to make a specimen. And then, I sketched some species of live plankton. Through these experiences, I gained real scientific knowledge and learned about a wide range of topics in science. As a result, I came to feel that science is truly enjoyable. I believe that this sense of “fun” is important in everything we do.

My science teacher gave me courage. She always looked out for me. When I had trouble with my studies, she always gave me a hand. I wasn't very confident at first, but she recognized that I was good at science. My scores were always a little higher than average, and my teacher praised me for it. This gave me a bit more confidence. Her support and this confidence encouraged me to try new activities throughout my time in graduate school. For instance, I participated in a two-week physics workshop when I was an undergraduate student.

Moreover, I had a chance to meet the professor of astronomy. This meeting was a trigger to start researching astronomy because I heard some recent research, and then I was able to imagine researching a little bit. A few years later, I interviewed this professor about my graduation thesis. I appreciated my science teacher for setting these opportunities.

Additionally, her career also expanded my options. In my school, few students want to enter the School of Science. Besides, in Japan, it is a minority of women who major in science. But I didn't hesitate to choose my path because she graduated from

the School of Science.

I decided to go to the university, and now I make a study of astronomy. My main target is “Near-Earth Asteroids (NEAs)”, whose orbits are in proximity to Earth. Asteroids hold ancient organic compounds, water-rich minerals, and the primordial building blocks of life. Then, they can tell us more about the solar system. This is directly related to the origin of Earth’s water, and, ultimately, to the origin of life.

My research goal is to determine how much water NEAs contain. This is directly related to the origin of Earth’s water, and, ultimately, to the origin of life. It is widely believed that the primitive Earth was too hot to retain water during its early formation. Therefore, many scientists proposed the hypothesis that water on Earth came from other objects, such as hydrated asteroids. In fact, certain asteroids (C-type asteroids) contain a large amount of water; this feature is close to that of seawater.

Water consists of hydrogen (H) and oxygen (O), and is commonly written as H_2O . Hydrogen is the lightest element and the most abundant element in the universe. Oxygen is essential for life. In asteroids, water is not always present in the form of liquid or ice. Instead, it is often found as hydroxyl (OH) or bound within hydrated minerals. This hydroxyl is probably the main source of water. Multi-color photometry and spectroscopy using telescopes are useful for investigating the presence of water on asteroids.

I have one more dream. I want to discover asteroids first using the Kiso 1.05-m Schmidt telescope at Kiso Observatory, Nagano, Japan. Finding potentially hazardous asteroids that could impact Earth contributes to planetary defence- a global effort to protect life and Earth. Nowadays, we are able to observe remotely. If it detects one

unknown moving object, I will soon do follow-up observations. But it is not easy today. Many large telescopes around the world are searching for asteroids every night. These telescopes have enough power to observe a wide range of the sky and find tiny objects.

I hope that one day contribute to uncovering the origin of Earth's water and discovering new asteroids.

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