



## Keywords

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# Memories of Professor Seiya Uyeda (1929 –2023)

Valiya M. Hamza<sup>1</sup> and Suze Nei Pereira Guimarães<sup>1</sup>

<sup>1</sup> Department of Geophysics, National Observatory, Rio de Janeiro, Brazil.

## Email address

hamza@on.br (V.M. Hamza)

Corresponding author

## Abstract

UYEDA, Seiya was born on November 28, 1929 in Tokyo, Japan. He served initially as professor of geophysics at the Tokyo University until retiring in 1990. After this actuated in the Tokai University until 2008. During this period, he was a visiting scientist or professor at US and Europe as in Cambridge, Oxford, Stanford, California (UCSD), Columbia (LDGO), Pierre et Marie Curie and Texas A&M universities, and Massachusetts (MIT) and California (Caltech) Institutes of Technology. His research covered rock magnetism, marine and land terrestrial heat flow, plate tectonics, geodynamics of subduction zone/island arcs, and earthquake prediction by seismic-electromagnetic methods. He has served for international projects and organizations, such as International Geodynamics (GDP) and Ocean Drilling (IODP), International Unions of Geodesy and Geophysics (IUGG) and Geological Sciences (IUGS). He has been conferred an Honorary Doctor of Philosophy from the University of Athens, and foreign membership of United States National Academy of Sciences, American Academy of Arts and Sciences, and Russian Academy of Sciences. These his many published scientific works he ended up receiving two awards throughout his career: Alexander Agassiz Medal, in 1972 and Walter H. Bucher Medal, in 1991.

## 1. Introduction

Seiya **UYEDA** was a Professor Emeritus of Tokyo University, Japan and a member of Japan Academy. He was born in Tokyo, Japan in November 28, 1929 and die in January 19, 2023 in Tokyo city too. Married with Mutsuko Kosaka, in July 6, 1952 has three children: Taro, Makiko and Naoko. Son of Seiichi and Hatsuo (Okino) University. Research associate in the Earthquake Research Institute at University of Tokyo (1957-1964) and associate professor (1969-1990) in Geophysical Institute in some university. After 1990 started acting as professor in the Department Marine Science and Technical of the Tokai University in Shimizu, Japan (1990-2008). In this period, was director in Earthquake Prediction Research Center Japan (1995-1996), professor in the Texas Agricultural and Mechanical University, College Station (1990-1995), and director International Frontier Program on Earthquakes Research Riken (1996-2002).

He graduated a Bachelor of Science at Tokyo University (1952). Doctor of Science, too Tokyo University (1958) and has been conferred an Honorary Doctor of Science from the Athens University, Greece (1996).

Fellow American Association for the Advancement of Science (honorary), National Academy of Sciences (foreign associate, A Agassiz medal 1972), Russian Academy of Sciences (foreign), Geological Society London (honorary),

European Union Geophysical Society (honorary), American Geophysical Union (Walter Bucher medal 1991). Member American Academy Arts and Sciences (foreign), Society Geology France (associate), Japan Academy (Academy prize 1987).



Figure 1 – Seiya Uyeda (1929 - 2023).

His research covered rock magnetism, marine and land terrestrial heat flow, plate tectonics, geodynamics of subduction zone/island arcs, and earthquake prediction by seismic and -electromagnetic methods. His work on plate tectonics and volcanic arc is typically connected to Arc as part of general Seismology study, connecting several disciplines of science. His work deals with themes such as Volcanism and Benthic zone, which intersect with Subduction.

His work carried out in the field of Geophysics brings together such families of science as Thermal conductivity and Heat flow. His research investigates the connection between Oceanic crust and topics such as Oceanography that intersect with problems in Volcano and Paleomagnetism. His Island arc research is multidisciplinary, incorporating perspectives in Geothermal gradient, Lithosphere and Magma.

He has served for international projects and organizations, such as International Geodynamics (GDP) and Ocean Drilling (IODP) Projects, International Unions of Geodesy and Geophysics (IUGG) and Geological Sciences (IUGS). Foreign membership of United States National Academy of Sciences, American Academy of Arts and Sciences, and Russian Academy of Sciences.

His most cited work include:

- Back-arc opening and the mode of subduction (1005 citations)
- Evolution of the western pacific and its margin (405 citations)
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## 2. Recent Papers

In recent investigations (2001-2018), he was focusing on the seismology, abundance oceanography, geophysics and ecology. His work on large earthquakes as part of general seismology study is frequently linked to electric signal, bridging the gap between disciplines. The concepts of this oceanography study are interwoven with issues in hydrology and sedimentation. His research in geophysics intersects with topics in subduction that combine topics from a wide range of discipline, such as volcanism, orogeny and plate tectonics and island arc that spans across into subjects like bedding, paleontology, tectonics and induced seismicity.

In this period, his most popular works were:

- Geothermal and Geomagnetic Data in and Around the Island Arc of Japan (74 citations)
- Hypothetical Model for the Bending of the Mariana Arc (72 citations)
- Some Basic Problems in the Trench-Arc-Back Arc System (70 citations)

The outflow of heat from the Earth's interior is, in terms of energy, the most impressive terrestrial phenomenon. Its present rate of about  $10^{21}$  joules per year is order-of-magnitudes greater than the energy dissipation of earthquakes or heat loss from volcanic eruptions. The study of the Earth's internal heat plays an important role in understanding the Earth's origin, internal constitution, and plate tectonics.

The Figure (2) show the Dr. Uyeda with Dr Hussong (1978) in Deep Sea Drilling Project, for a discussion of findings for Leg 60, the research vessels almost 200-foottall drilling derrick can be seen in the background.



Figure 2 – Donald Hussong (left) and Seiya Uyeda (right) in deck of D/V Glomar Challenger (ship).

## 3. Dr. Uyeda in International Heat Flow Committee (IHFC)

The study of the thermal structure of the Earth, generally referred as the geothermics or also as the (terrestrial) heat flow, has a long history. However, the modern geothermics, one of the fundamental geophysical disciplines, is relatively young. The International Heat Flow Commission (IHFC), under which the academic geothermal research on the international scale is organized, was created only in 1963, which had the participation of Dr. Uyeda since its creation.

The participation of professor Uyeda in officers of IHFC was explain in Table (1).

Table 1 – Participation of Dr. Uyeda in IHFCC.

Term	function
1963-1967	Member
1967-1971	Vice-chair
1971-1975	Vice-chair
1975-1979	Member
1979-1983	Member
1983-1987	Vice-chair
1987-1991	Chair
1991-1995	Member
1995-1999	Member
1999-2003	Member
2003-2007	Member
2007-2011	Member
2011-2015	Member
2015-2019	Member
2019-2023	Member



Figure 3 – Ilmo Kukkonen presenting a plaque to Seiya Uyeda in 40<sup>th</sup> anniversary IHFC.

#### 4. Books and Best Publications

Until the late 1960s, scientists believed that the Earth was a rigid body, with fixed continents and oceans. The scientific revolution, supported by the theory of plate tectonics, then came to prove that the Earth has a fragile surface in constant movement, composed of large plates that collide, separate and collide again. These movements are responsible for the creation of new basins, mountains, volcanoes, earthquakes and other dramatic features and events. In an informal and engaging style, Dr. Uyeda introduces the reader in his book: “The new view of the Earth: Moving continents and moving oceans”, published in 1978, with different translations of the world.

Physical and chemical studies of the earth and planets along with their surroundings are now developing very rapidly. As these studies are of essentially international character, many international conferences, symposia, seminars and workshops are held every year. To publish proceedings of these meetings is of course important for tracing development of various disciplines of earth and planetary sciences though publishing is fast getting to be an expensive business. So it was organized a series of publication titled “Advances in Earth and Planetary Sciences”, 2010 that the Dr. Uyeda as the general editor.

One of his most traditional books is about “Debate about the Earth: Approach to Geophysics through analysis of continental drift”, 1968. “Island Arcs Japan and its environs”, 1973 was other traditional book that englobe parts of your research, this book first reviews the geophysical and geological features of island arcs, including topography, crust and upper mantle structure, seismicity, direction of principal stresses of earthquakes, crustal deformation and fault systems, and geological structure. The text is a valuable reference for geologists and readers interested in island arcs.

Of its plurality of Earth studies, the ones that stood out the most with the highest number of citations were:

Table 2 – Relations of most cited publication of Dr. Uyeda.

Citations	Publication
1355	Back-arc opening and the mode of Subduction. <b>S. Uyeda</b> ; H. Kanamori. Journal of Geophysical Research (1979)
628	Evolution of the western pacific and its margin. T.W.C. Hilde; T.W.C. Hilde; <b>S. Uyeda</b> ; L. Kroenke; L. Kroenke. Tectonophysics (1977)
395	Thermal processes under island arcs. K.Hasebe; N. Fujii; <b>S. Uyeda</b> . Tectonophysics (1970)
368	On the pacific-type orogeny and its model — extension of the paired belts concept and possible origin of marginal seas. T.Matsuda; <b>S. Uyeda</b> . Tectonophysics (1971)
345	Subduction zones: An introduction to comparative subductology. <b>S. Uyeda</b> . Tectonophysics (1982)
284	Stress gradient in arc–back arc regions and plate subduction. Kazuaki Nakamura; <b>S. Uyeda</b> . Journal of Geophysical Research (1980)
272	Estimates of heat flow derived from gas Hydrates. M. Yamano; <b>S. Uyeda</b> ; Y. Aoki; T. H. Shipley. Geology (1982)
204	The evolution of the China Basin and the mesozoic paleogeography of Borneo. Z. Ben-Avraham; <b>S. Uyeda</b> . Earth and Planetary Science Letters (1973)
154	Nankai Trough and Zenisu Ridge: a deep sea submersible survey. X. Le Pichon; T. Iiyama; J. Boulègue; J. Charvet; M. Faure; K. Kano; S. Lallemand; H. Okada; C. Rangin; A. Taira; T. Urabe; <b>S. Uyeda</b> . Earth and Planetary Science Letters (1987)
152	Formation of Active Ocean Margins N. Nasu; K. Kobayashi; <b>S.Uyeda</b> ; I. Kushiro. Terra Scientific Publ., Tokyo (1986)

#### 5. Acknowledgments

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