

論文の内容の要旨

Submarine Mud Volcanism from a Standpoint of Subseafloor Material Cycling

(海底下物質循環からみた海底泥火山に関する研究)

喜岡 新

Mud volcanism falls behind other mainstream research areas in the Earth and Planetary Science. Mud volcanism on Earth, however, provides profound insights into subsurface cycling of sediment and fluid, plays an important role in the subsurface carbon cycle, and has thus always been of interest to a broad scientific community. In this thesis, I present results of submarine mud volcanism that span a number of independent topics within the broader disciplines of geology, sedimentology, geophysics, and geochemistry. The issues presented in each chapter are slightly different, but the approach handled throughout aims to understand the roles of submarine mud volcanoes on the subseafloor

material cycling. The three primary results of this thesis can be summarized as follows:

(1) The shape of the submarine mud volcano depends on its width of feeding conduit and erupted volume, and is associated with sediment influxes in subduction zones. (2)

Ascent mechanism of ejecta that include fluid-rich muds and clasts from a submarine mud volcano in the eastern Mediterranean Sea is now understood in the light of sample

measurements and modeled thermal structure. (3) Methane amounts inside a deep-water mud volcano are studied using seismics, revealing that the amount of methane in its

conduits is higher than previously expected from geochemical evidence. All the results

obtained in this thesis represent an increase in our understanding of submarine mud volcanism and its relation to seafloor material cycling.