



# NAI Focus Group

NASA ASTROBIOLOGY INSTITUTE

Ronald Greeley, Chair  
Department of Geological Sciences  
Arizona State University, Tempe, AZ  
greeley@dione.la.asu.edu

The objective of the Europa Focus Group (EFG) is to foster scientific studies and joint investigations of Europa and related research in order to understand the exobiological potential of this satellite of Jupiter. This goal is to be met through various video conferences, workshops, and information exchanges sponsored by the NAI. The study of Europa requires a multidisciplinary approach using spacecraft data analyses, laboratory simulations, terrestrial analog studies, and other techniques to understand the complex history and present environments on and in Europa. Participation in the EFG is, therefore, open to all interested members of the relevant communities, including (but not restricted to) planetary scientists, biologists, and terrestrial ice scientists.

## Background

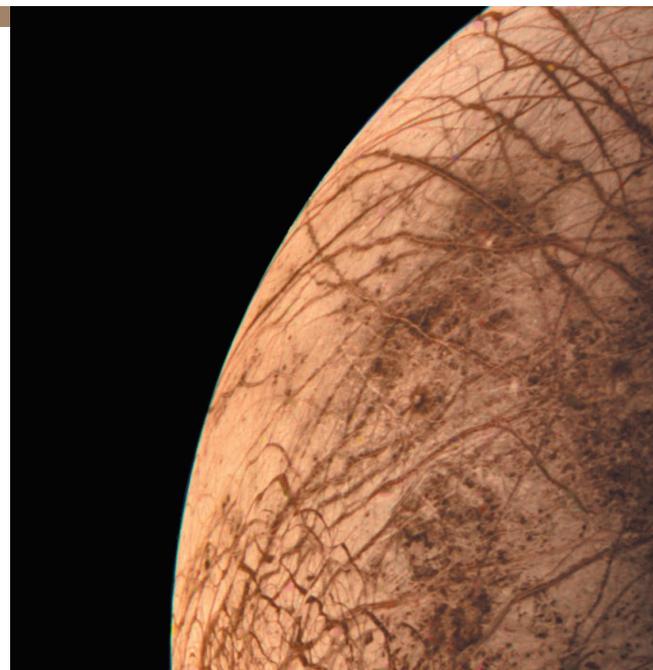
Europa has been identified by NASA (1999) and the National Academy of Sciences (NRC, 1999; 2000) as a high priority for exploration. This priority is established largely because Europa appears to be one of the few objects in our Solar System having conditions favorable for life. Europa is a rocky object slightly smaller than Earth's moon. It has an outer shell of water composition, modeled to be ~150 km thick, the surface of which is frozen. Several lines of evidence suggest that liquid water existed below the ice crust in the recent geologic past, and that liquid water might be present today. Friction generated by tides within Europa through its interaction with Jupiter and neighboring satellites might generate sufficient heat to fuel silicate volcanism at the base of

the water layer. These factors, coupled with remote sensing observations of various salts on the surface and the likely implantation of organic compounds through cometary impact lead to the presence of the essential ingredients for exobiology: an energy source, water (possibly liquid), and organic chemistry. The Europa Focus Group provides a forum to bring the relevant interests together to exchange information and share ideas regarding Europa, including plans for its future exploration.

## Recent Activities

An organizing workshop was held at NASA Ames Research Center in early February, 2001, involving about 65 participants, including invitees who had not previously been involved with planetary science. The workshop was organized around the following topics: 1) Europa and terrestrial analogs (sea-ice, etc.), 2) aqueous (liquid and ice) organic chemistry relevant to Europa, 3) strategies in the search for life at Europa,

The moon Europa has attracted increased interest as evidence mounts that a liquid ocean may lie beneath the frozen crust.

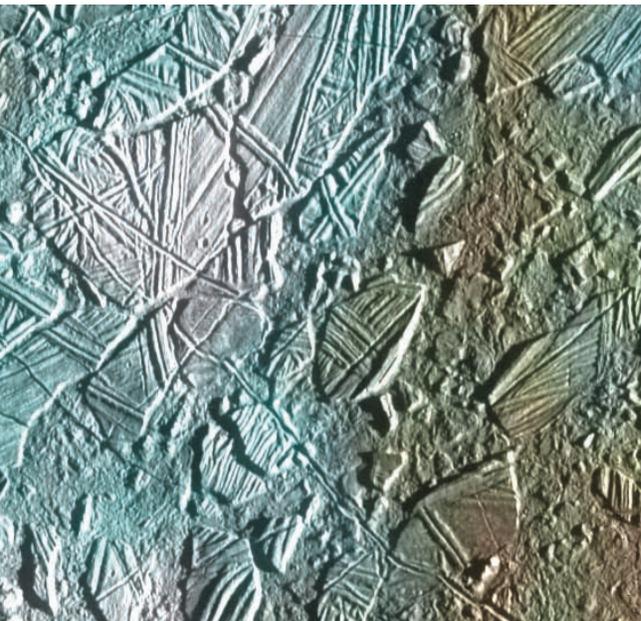
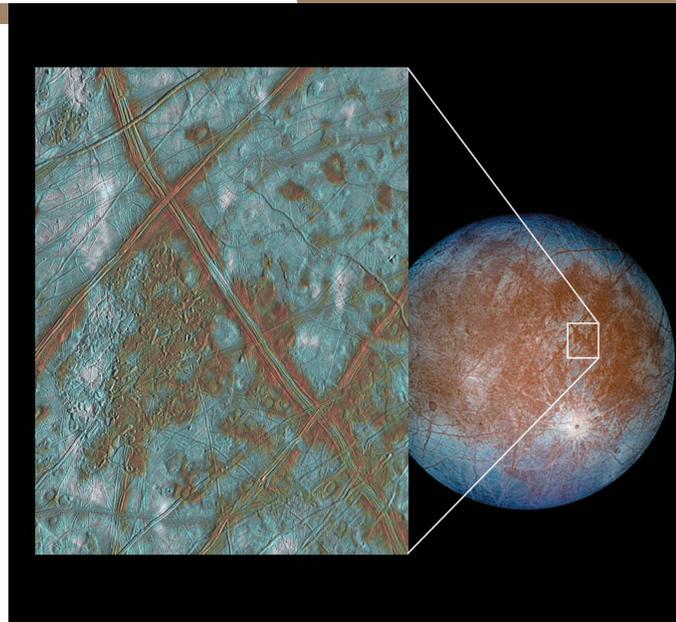


and 4) future exploration: needs, priorities. The EFG also met as a special breakout session during the Year 2001 General Meeting of the NAI, held in Washington, D.C. The EFG met most recently at a workshop held during September 2001 at the US Geological Survey Astrogeology facility in Flagstaff, Arizona. This workshop provided the opportunity for participants to share their new research findings through one or two focused questions, and to provided a venue to foster new collaborations.

## References Cited

- NASA (1999) AO 99-OSS-04, Deep Space Systems - Europa Orbiter Mission.
- National Research Council (1999) A Science Strategy for the Exploration of Europa. National Academy Press, Washington, D. C., 68 p.
- National Research Council (2000) Preventing the Forward Contamination of Europa. National Academy Press, Washington, D. C., 54 p.

This image from the Galileo spacecraft shows the surface features on Jupiter's icy moon.



This image shows a region of Europa's crust made up of blocks which are thought to have broken apart and "rafted" into new positions.