History of Investigation

Anderson (1951) classified faults into normal, strike-slip and reverse faults (thrusts) depending on which of the three principal stresses is the vertical one.

IAU Descriptor Term

► Fossa

See Also

► Fracture
► Graben

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Fault Terminations

► Secondary Fault

Faulted Band (Europa)

Michelle Selvans
Center for Earth and Planetary Studies, National Air and Space Museum, Smithsonian Institution, Washington, DC, USA

Definition

Tectonically deformed dilational bands, showing lineations caused by normal faults.

Category

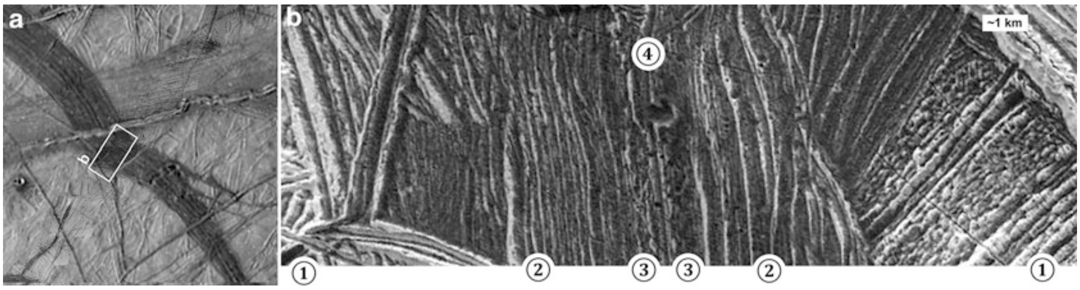
A type of ► lineated band on Europa.

Synonyms

Ridged band (Stempel et al. 2005); not recommended

Description

Linear to curvilinear features having grossly axisymmetric morphology, with a narrow, linear



Faulted Band (Europa), Fig. 1 Anatomy of a faulted band. A central trough runs along the central axis, inferred to be a spreading axis. A hummocky zone is found along both sides of the central trough; outside of this are wide lineated zones running subparallel to the margins (Prockter and Patterson 2009, Fig. 11) (*1*) ridged plains, (*2*) lineated zone, (*3*) hummocky zone, (*4*) central trough. Galileo 12ESWEDGE_02 mosaic (NASA/JPL/ASU)

central trough flanked by a hummocky textured zone, beyond which are subparallel ridges and troughs; commonly showing a ridge at the sharp boundary with the surrounding terrain (Prockter et al. 2002).

Interpretation

They appear to be faulted smooth bands (Prockter and Patterson 2009). Subparallel ridges and troughs are similar in their characteristics to imbricate fault blocks. They have distinct troughs along their axis, inferred to be the spreading axis. Older faults translate further away from the actively spreading central axis over time. Tilted fault blocks in those bands with low spreading rate may create repeating valleys and ramparts (Kattenhorn and Hurford 2009).

Formation

They are thought to be formed by extensional stresses (e.g., Figuerdo and Greeley 2004; Nimmo 2004), through exploitation of a preexisting double ridge, with the ridges moving apart and filling in with buoyant ductile material from below that cooled and faulted as it moved away from the central trough.

Degradation

► Lineated band

Studied Locations

For example, Yelland and Ino Lineae, in Argadnel Region (the “wedges region”), which intersect near 16°S, 196°W (Fig. 1).

Astrobiological Significance

These features likely formed while warm, ductile ice (which could have been coupled to the underlying, global ocean) was exposed at the surface.

Terrestrial Analog

The central trough, hummocky zone, and series of troughs and ridges have been modeled using the analog of a mid-ocean ridge (Stempel et al. 2005).

See Also

► Band (Europa)
► Normal Fault

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Feather Fracture

► Secondary Fault

Felsenmeer

► Blockfield (Periglacial)

Festoon (Lava)

Scott S. Hughes[1] and Stephanie C. Werner[2]
[1]Department of Geosciences, Idaho State University, Pocatello, ID, USA
[2]Comparative Planetology, Centre for Earth Evolution and Dynamics, University of Oslo, Oslo, Norway

Definition

Pattern of arcuate, bent, or looped ridges exposed on the surface of a lava flow or on an outcrop of cross-bedded sediment.

Synonyms

Corda; Festoon deposit; Festoon ridge

Description

Pahoehoe festoon or festoon ridge (corda) is a subtype of ► pressure ridge. Ridges on pahoehoe lava flows are regularly spaced ~5–50 cm apart, where the ropy surface is dragged by the underlying molten lava into festoon patterns. The morphology of festoon-like ridges and flow bands is often characterized using fractal geometry of lava flow surfaces; sizes of festoon ridges range from small-scale 2–20 cm pahoehoe ropes to meso- and large-scale features 1–100 m high with spacings ranging from 10 m to several hundred meters apart (on rhyolite flows) (Theilig and Greeley 1986, 1987).

Interpretation

The lava's surface crust is folded when in a semisolid state during the final still-mobile stages of emplacement as viscosity increases due to cooling.

Formation

Emplaced as sheet flows from basaltic flood lava eruptions (Theilig and Greeley 1987). The formation and growth of arcuate ridges oriented perpendicular to lava flow direction depend on the physical properties of the flow, specifically the viscosity. The ridges could result from compression of the fluid in which the viscosity decreases with depth and form in the cooling upper layer of the flow. The ridge size and spacing depends on flow rheology, thermal boundary layer thickness, and applied stress (Theilig and Greeley 1986).