Introduction: Platy plains terrain in Elysium and Ama- 
zonis Planitia consist of fractured plates up to 10s of kilome-
ters in size that show evidence of break-up, rotation and 
horizontal drift. This suggests initial formation as a two-
phase material (fluid interior, brittle ‘crust’) which later 
completely solidified, fixing the rafted crust in place. The 
origin of this terrain is controversial [1] and the debate con-
tinues as to whether it is lava plains [e.g. 2, 3] or remnants of 
a lake or sea of frozen water [e.g. 4, 5].

We have begun mapping the platy deposits to the West 
of the Cerberus Fossae (145-160 o E) using HRSC (12-
a lake or sea of frozen water [e.g. 4, 5].

zoneis Planitia consist of fracture d plates up to 10s of kilome-
ters in size that show evid ence of break-up, rotation and 
with MOLA, HRSC and MOC-NA DEMs. The combination 
of a regional view and high resolution details has revealed 
indicators within channels show similar directional trends. 
25m/pixel), THEMIS vis (18- 40m/pix), THEMIS IR (100-
ners and their associated flows. Further study of HRSC 
plates show a distinctive ‘arching’ pattern that is concave 
downslope (figure 2d). This is similar to sea ice within chan-
channels on Earth, but opposite to channelised platy lava flows-
such as Burfellshraun, Iceland that are concave upslope.

4. ‘Shear zones’ (figure 2d) and shear fractures with 
romboideal openings are seen in the platy terrain. Again, these 
structure is similar to those found in terrestrial sea ice and 
implication of a material with weak resistance to 
ference toughnshess of sea ice is ~ 0.1-0.3 MPa m 1/2 
komparison to ~ 2-3 MPa m 1/2 for basalt [7]).

5. Multiple episodes of large scale fracturing and re-
freezing of plates are visible, again suggesting a material 
with poor resistance to fracture.

6. The stratigraphy/topography of the deposits within the 
(region almost certainly) water-carried inter-lake channels (figure 
2c) is difficult to reconcile with a lava flood genesis. Multi-
ple water-lava-water events are required. A single water flow 
episode that erosates channels and forms platy terrain is a 
simpler explanation.

Conclusion: Mapping is revealing more and more evi-
dence supporting a sea ice origin for Elysium platy terrain. 
In the Western part of the study area the morphologies are 
particular well explained by the sea ice hypothesis. Never-
theless, there are features to the East of the study area such 
very low slope shied-like edifices, flows with lobate 
edges and small vents with associated flows that could 
be explained as either very low viscosity lava or mud volca-
noes and their associated flows. Further study of HRSC 
DEMds and particularly HiRise images and DEMs is required.

References: [1] Sakimoto, S., (2006) LPSC XXXVII ab-

MORPHOLOGICAL EVIDENCE FOR A SEA-ICE ORIGIN FOR ELYSIUM PLANITIA PLATY 
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Fig. 1. Outline of Elysium platy terrain complex and associated channels. Plate movement directions shown in red. Background is MOC WA mosaic. Fig.2a. Sinusoidal/finger rafting in Elysium complex (MOC NA M21-00131). Fig.2b. Aerial photo of sinusoidal ridging in sea ice on Earth. Fig.2c. ‘Tide crack’ in the Elysium region (HRSC h2165). Fig.2d. A channel of platy terrain within the main Elysium complex. Flow is top right to bottom left. Note the shear zone ridges and the concave downstream shape of the plates. (HRSC h2121) Fig.2e. Inter-lake channel (marked X on fig 1) showing erosion by water and superposing plates (HRSC h2121).