

**SAS Honors Seminar 259:
Extraterrestrial Life**

10/29/2008

Tunguska event

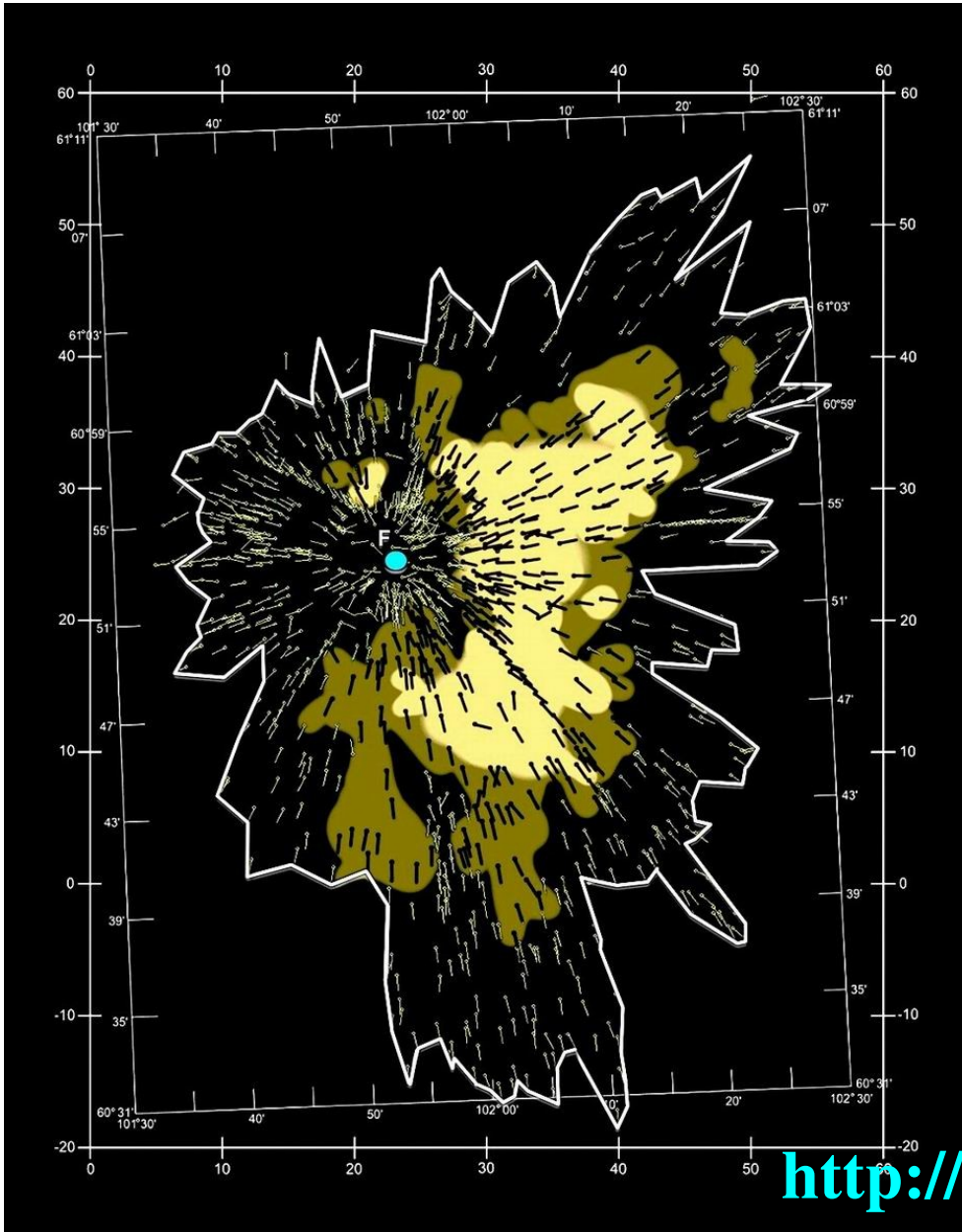


**2004 image of
1908 site**

**80 million trees
felled over
an area of
~2150 km²**

<http://www-th.bo.infn.it/tunguska/>

Tunguska event



**2005 map of tree fall directions
used to model blast wave
(Longo et al. 2005)**

**lighter colors =
greater certainty**

comet or disintegrating asteroid?

<http://www-th.bo.infn.it/tunguska/>

Impact craters on the Earth: #5

**Manicouagan Reservoir
Quebec, Canada**

214 Myr ago

crater ~ 100 km diameter

Earth Impact Database

<http://www.unb.ca/passc/ImpactDatabase/>



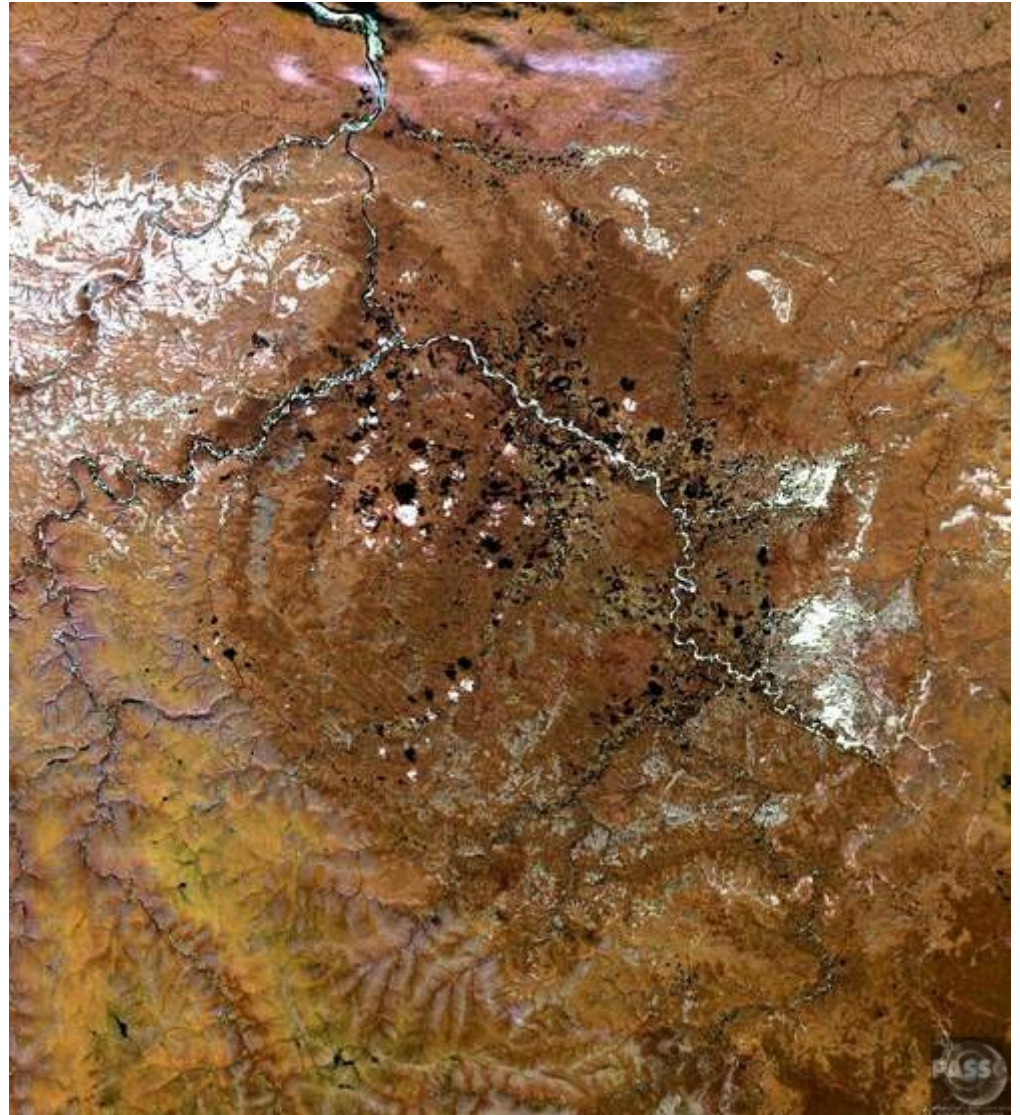
Impact craters on the Earth: #4

Popigai Crater

Russia

36 Myr ago

crater ~ 100 km diameter



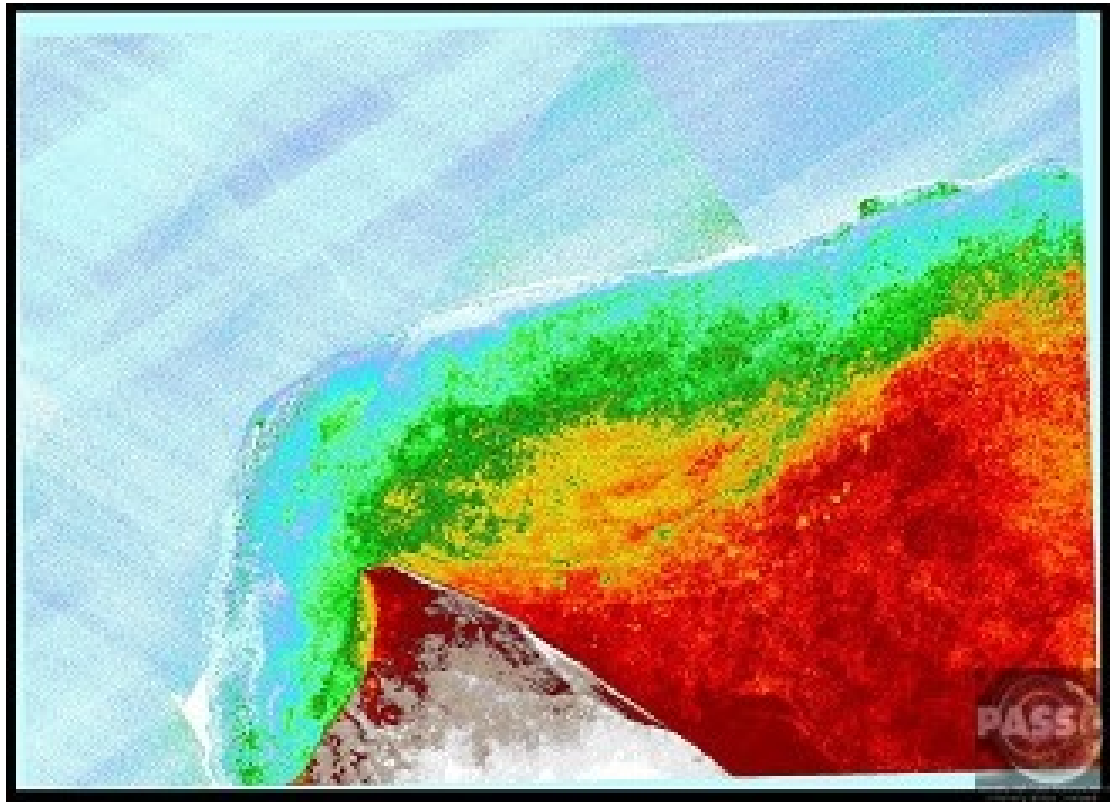
Impact craters on the Earth: #3

Chicxulub Crater

Yucatan, Mexico

65 Myr ago

crater ~ 170 km diameter



radar image

Impact craters on the Earth: #2

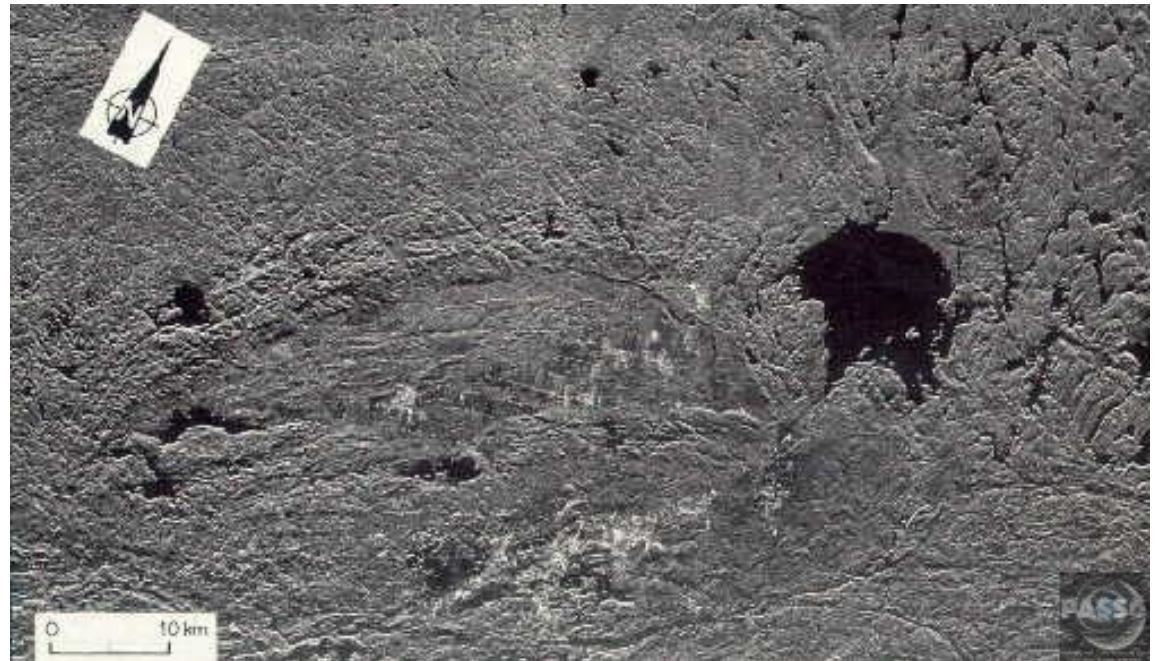
Sudbury Crater

Ontario, Canada

1850 Myr ago

(fourth oldest)

crater ~ 250 km diameter



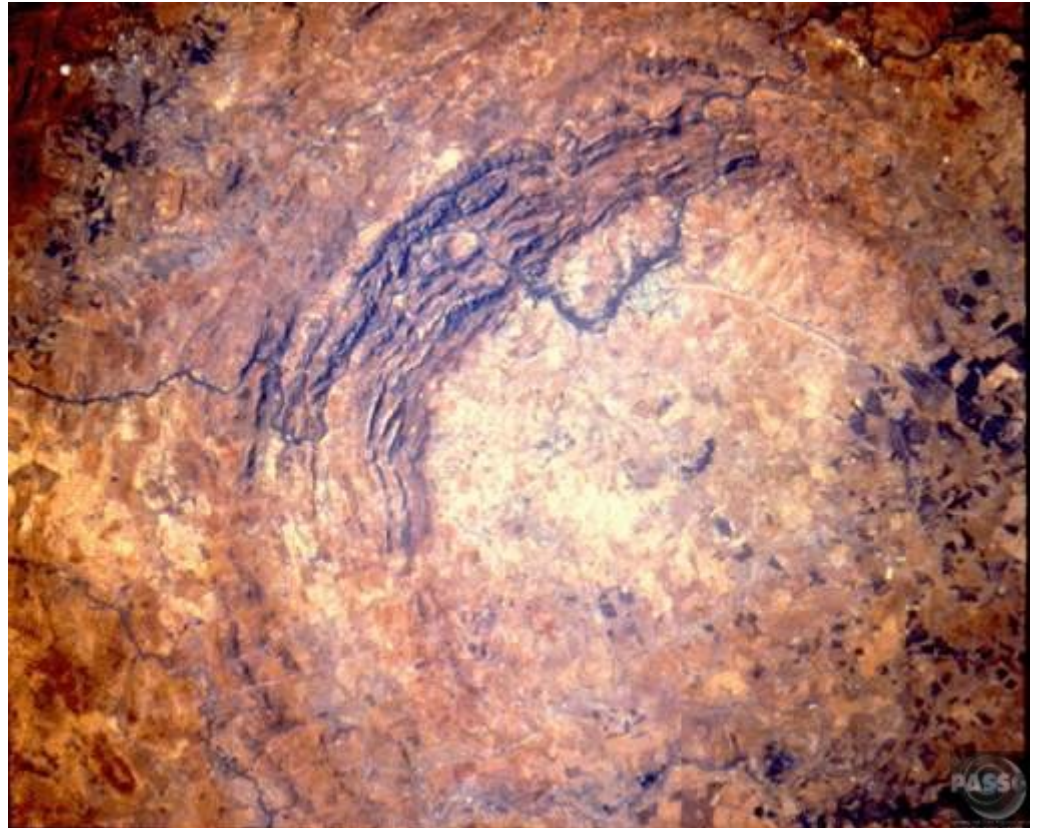
radar image

Impact craters on the Earth: #1

Vredefort Crater
South Africa

2023 Myr ago
(second oldest)

crater ~ 300 km diameter



What is “Gubbio clay”?



central Italy

Alvarez & Alvarez near Gubbio



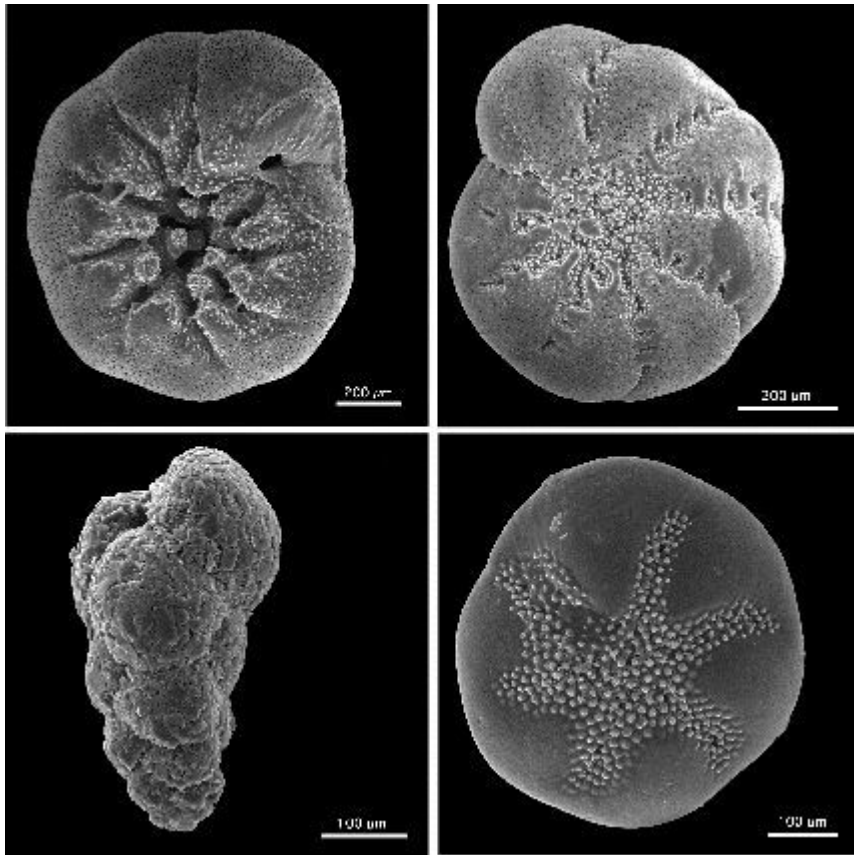
Luis
(physicist)

Walter
(geologist)

Gone but not forgotten: ammonites



Not entirely gone: foraminifera



[Paleocene fossils]

Reading for Monday (11/3)

**Bennett & Shostak 11.2 – reread pp 379-384 only,
as background for rest of discussion**

**Sagan et al. (1993) – use *Galileo* observations to find
evidence “strongly suggestive of life on Earth”**

**Arnold (2008) – review of attempts to detect the
“Vegetation Red Edge” in Earth's spectrum**

Cheat sheet for latter two articles to be posted.

Almost certainly no office hours this Friday!

Due next Monday (11/3)

Response paper #7:
Assuming that NASA
only has enough
money to fund one
astrobiological mission
(i.e., a search for
evidence of life)
in the next ten years,
should this mission
focus on Mars,
Europa, or Titan?
Explain and justify your views.

