

Asteroid Detected Hours Before Impact

- A routine search revealed a small asteroid hurtling toward Earth
- Rapid international observations predicted the object's impact 19 hours later over Sudan
- The fireball from the asteroid breaking up in the atmosphere was observed by passing aircraft, satellites and residents of Sudan
- This small impact tested NASA warning procedures developed for more ominous impact events

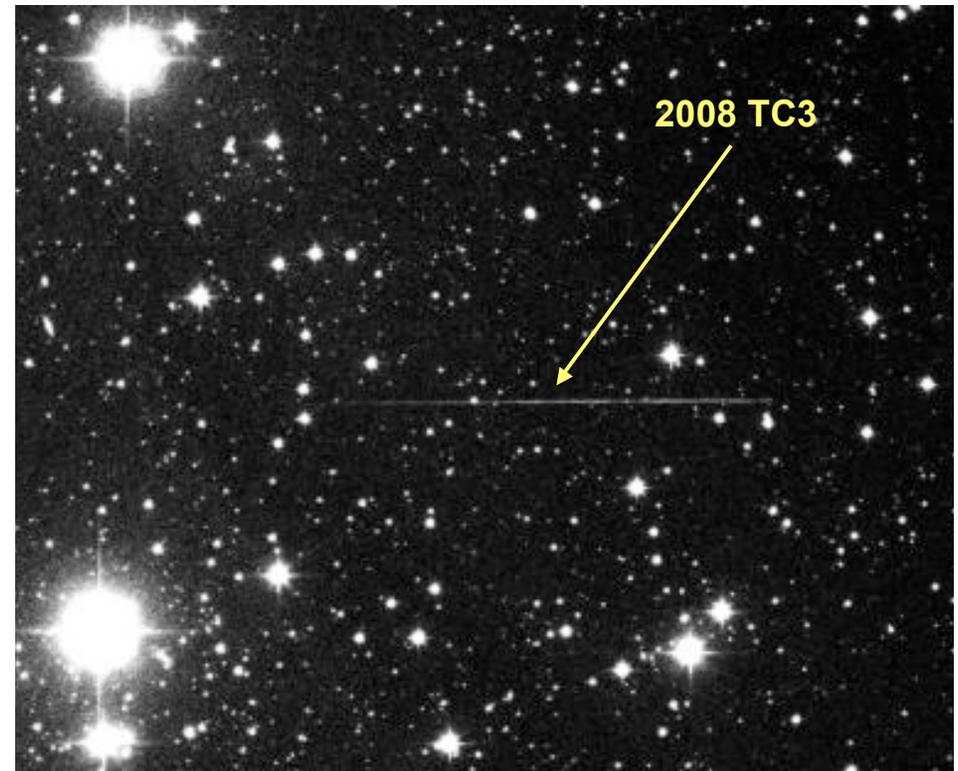


Image of F class asteroid 2008 TC3 in the hours before it impacted Earth. Exposure time was 6 minutes, so the asteroid appears as a streak. Image from La Sagra Sky Survey, Spain.

Meteorites Found from Asteroid

- The small asteroid was expected to vaporize in the atmosphere but a joint NASA-Sudanese team undertook a search for fragments
- Surprisingly, ~280 fresh-looking meteorites have been found spread along TC3's predicted ground track
- Analysis of the collected samples enabled scientists to determine the asteroid's composition and type
- Meteorite composition and density suggest TC3 was ejected from the surface of a larger asteroid of rare type



A meteorite from 2008 TC3 is discovered in the Nubian Desert of Sudan by staff and students of the University of Khartoum, led by Dr. M.H. Shaddad (Univ. Khartoum) and P. Jenniskens of SETI / NASA Ames.

The Big Picture

- 2008 TC3 was the first asteroid observed from space to the ground
- For the first time, scientists can study meteorite samples knowing where the meteorites came from
- Global cooperation and increasingly widespread technology may make these fortuitous events more common



Clockwise from top left: Telescope of the Catalina Sky Survey where TC3 was discovered; Detection image of 2008 TC3; Cell-phone image of luminous trails left in the atmosphere when TC3 disintegrated into dust; TC3 meteorite in the Nubian Desert of northern Sudan

For More Information...

Press Releases

- Nature - 3/26/09 - “The Rock that Fell to Earth”
<http://www.nature.com/news/2009/090325/full/458401a.html>
- The Planetary Society - 10/07/08 - “The full story of Earth-impacting asteroid 2008 TC3”
<http://www.planetary.org/blog/article/00001684/>
- Space Daily - 03/30/09 - ‘NASA Team Finds Riches In Meteorite Treasure Hunt’
http://www.spacedaily.com/reports/NASA_Team_Finds_Riches_In_Meteorite_Treasure_Hunt_999.html
- SETI Institute - 03/30/09 - ‘Surprise Recovery of Meteorites Following Asteroid Impact’
<http://www.seti.org/Page.aspx?pid=1281>
- NASA / JPL - 11/04/08 - ‘Asteroid 2008 TC3 Strikes Earth: Predictions and Observations Agree’
<http://neo.jpl.nasa.gov/news/2008tc3.html>

Images

- 2008 TC3 pre-impact image courtesy of La Sagra Sky Survey, Spain
http://www.minorplanets.org/OLS/2008_TC3/
- All remaining images courtesy of NASA, found at <http://www.nasa.gov/topics/solarsystem/tc3/>
 - Catalina Sky Survey images courtesy of Catalina Sky Survey
 - Atmospheric luminous trail image from M. Elhassan (Noub NGO), M.H. Shaddad (Univ. Khartoum), and P. Jenniskens (SETI Institute/NASA Ames)
 - Meteorite images courtesy P. Jenniskens (SETI / NASA Ames)

Source Article (on-campus login may be required to access journals)

- Jenniskens et al., ‘The impact and recovery of asteroid 2008 TC3’, *Nature*, **458**, p. 485 doi: 10.1038/nature07920, 2009. <http://www.nature.com/nature/journal/v458/n7237/full/nature07920.html>

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