

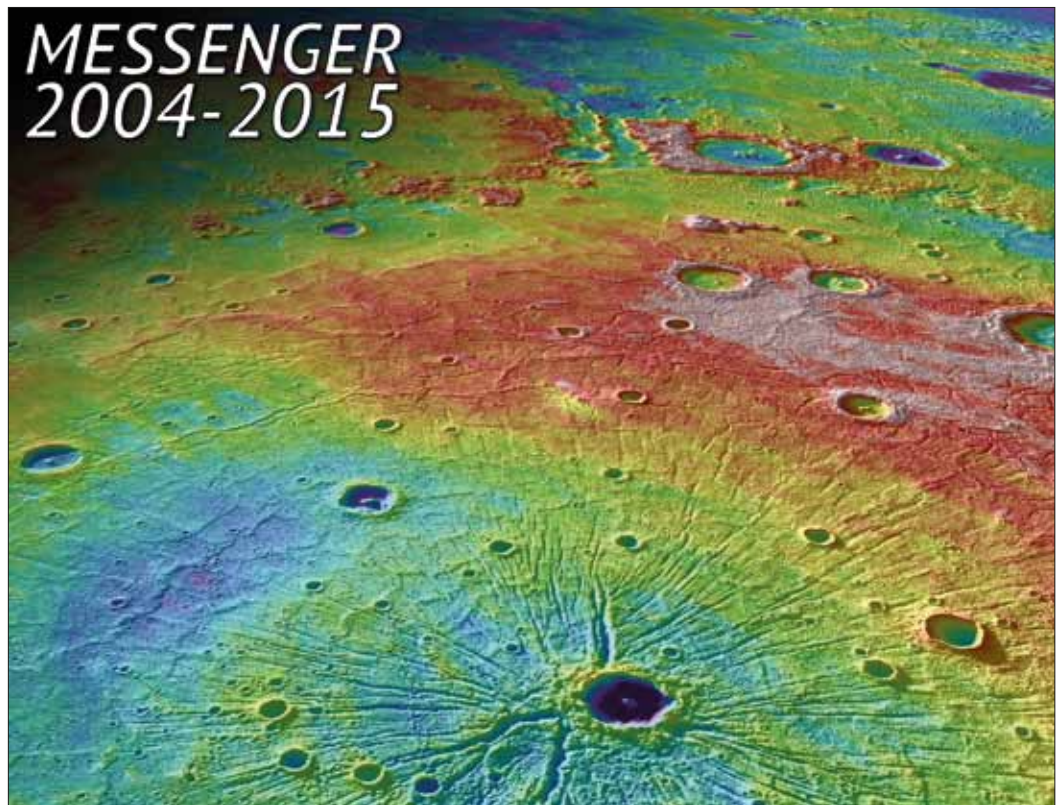
# MESSENGER meets Mercury

**MERCURY** NASA's MESSENGER spacecraft ended its mission to Mercury on 30 April this year with an unseen 14000 km per hour crash on the planet's surface, forming its own impact crater. The impact was not observed because it took place on the far side of the planet from Earth.

MESSENGER was a planetary exploration mission that went into orbit around Mercury on 17 March 2011 (after launch in 2004) for what was intended to be a one-year mission. In the four years of its operation, the spacecraft mapped 45% of Mercury's surface, picking up on chemical and mineralogical anomalies, tracked its magnetism and space environment and found ice collected at the poles. The mission also noted unusual surface compositions, perhaps reflecting an ancient giant impact; the existence of chemically distinct regions across the planet suggest a chemically heterogeneous mantle beneath.

The planet has a magnetic field that suggests an active core dynamo, but the core may have a solid outer shell or iron sulphide above a liquid iron core with possibly a solid inner core. The field also appears to originate in its northern hemisphere.

Radar data before MESSENGER reached Mercury



Much of Mercury's surface was brought into focus by MESSENGER – scientifically and literally. This is a false-colour image with white and red indicating high topography and greens and blues lower ground. The view northwest over the Caloris Basin shows, to the right, the arc of mountains edging the 1500 km diameter impact basin. Lower centre are the Pantheon Fossae, tectonic troughs that radiate from the centre of the basin. Younger impact craters pepper the basin, including a prominent one just offset from the centre of the Pantheon Fossae. This is Apollodorus and is 41 km across. Background image texture comes from the Mercury Dual Imaging System instrument, while the coloured surface elevation data come from the Mercury Laser Altimeter (MLA) experiment. Both sets of imagery were draped over a digital elevation model based on MLA altimetric data. (NASA/Johns Hopkins Univ. Applied Physics Laboratory/Carnegie Institution of Washington/Goddard Space Flight Center)

had shown bright spots near the poles consistent with water ice. This mission located these radar-bright spots to areas of permanent shadow, suggesting the survival of water ice and

possibly volatile organic compounds there.

The mission also examined Mercury's tenuous exosphere and space environment, finding traces of water and regular peaks

in calcium thought to indicate input from the debris of comet 2P/Encke – debris from which gives rise to the Taurid meteor shower on Earth.

<http://messenger.jhuapl.edu>

## VIEWS

### Let's share our music of the spheres

**LETTER** From Karen Aplin and Dominic Williams

We were delighted to see the article on Sibelius and astronomy in the April issue of *A&G* (Whittet 2015). We were aware that Sibelius was deeply inspired by atmospheric phenomena, picturing storms and aurorae in his tone poems *Tapiola* and *Nightride and Sunrise* (Aplin & Williams 2011). In Sibelius's 150th birthday year, Whittet offered further insight into Sibelius's astronomical influences both through his family background, and his subsequent influences on astronomy through the eponymous asteroid and crater on Mercury.

Through our work investigating the effects of weather on music (Aplin & Williams 2011, 2012, Brown *et al.* 2015), we found that the

approach of combining music and science is an effective medium for communicating the variability of the natural world to non-scientists. Several studies already exist exploring the intersections between astronomy and music (e.g. Caballero *et al.* 2008), many of which were listed by Fraknoi (2009), but there has not yet been a quantitative study using our methodology.

We wondered if readers of *A&G* might like to contribute to a list of other space and astronomy influences in all types of music, for a possible future article. Examples from pop music might include *The Final Countdown* (Europe) and *Walking on the Milky Way* (OMD), and apart from the obvious *Planets* in classical music, another example would be Debussy's *Au Clair de*

*la Lune*. We have set up a shared document at <http://goo.gl/forms/FALvBw37cl>, where you can enter your suggestions.

Dr K L Aplin (University of Oxford, Physics) and Dr P D Williams (University of Reading, Meteorology)

#### REFERENCES

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Caballero J A *et al.* 2008 *Proc. Spanish. Ast. Soc. Conf. Santander*, 7th–11th July 2008 arXiv:0810.2032

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### Crew Dragon passes safety test

**HUMAN SPACEFLIGHT** SpaceX, the company working with NASA to develop rockets for human spaceflight, have successfully tested a system to rescue astronauts in an aborted launch.

The test was a first for the Crew Dragon spacecraft. The crew capsule used its eight SuperDraco engines to leave the launch pad, then parachute safely into the Atlantic Ocean. Sensors on the test dummy in the capsule indicated that any astronauts on board would have been safe. "NASA is committed to returning American space launches to US soil," said NASA Administrator Charles Bolden, "and an important step toward that goal took place today."

<http://1.usa.gov/1vfiP0b>