Geology Matters

The newsletter of Malvern U3A geology group
May 2017

The leader

Thanks as ever to our speaker, Sue Hay from the EHT, in April on the town of Idar Oberstein. Her talk was a fine combination of geology and jewellery and certainly will have whetted the appetite of some to make a trip there one day! Talking of field trips, thanks go again to John Payne for leading a trip around the southern end of the Malvern Hill earlier this month.

It is amazing to think that we have just one more meeting in our winter series, but it does at least mean that spring is well and truly with us and we can look forward to some outside trips. The meeting on 10th May is our annual opportunity to give you a chance to provide the Steering Committee with any feedback, suggestions etc. The agenda for the meeting is as follows:

- Fuerteventura – Alan Gray
- The field trip to Pembrokeshire – Roger Hunt/Richard Newton
- Feedback from our 4 subgroups
- Sitges/Barcelona 2018 – Geoff Carver
- Members feedback session

Remember this is a free meeting (no subs) so do come along.

At April's meeting I mentioned the fact that Geoff Carver will be standing down as the person who plans our overseas field trip programme after the 2018 trip. I asked if anyone would be prepared to take on this role – as you might imagine I have been overwhelmed with volunteers! The role is as follows:

- Identify interesting options for overseas trips.
- Investigate travel and accommodation options
- Find geology leaders for the trip

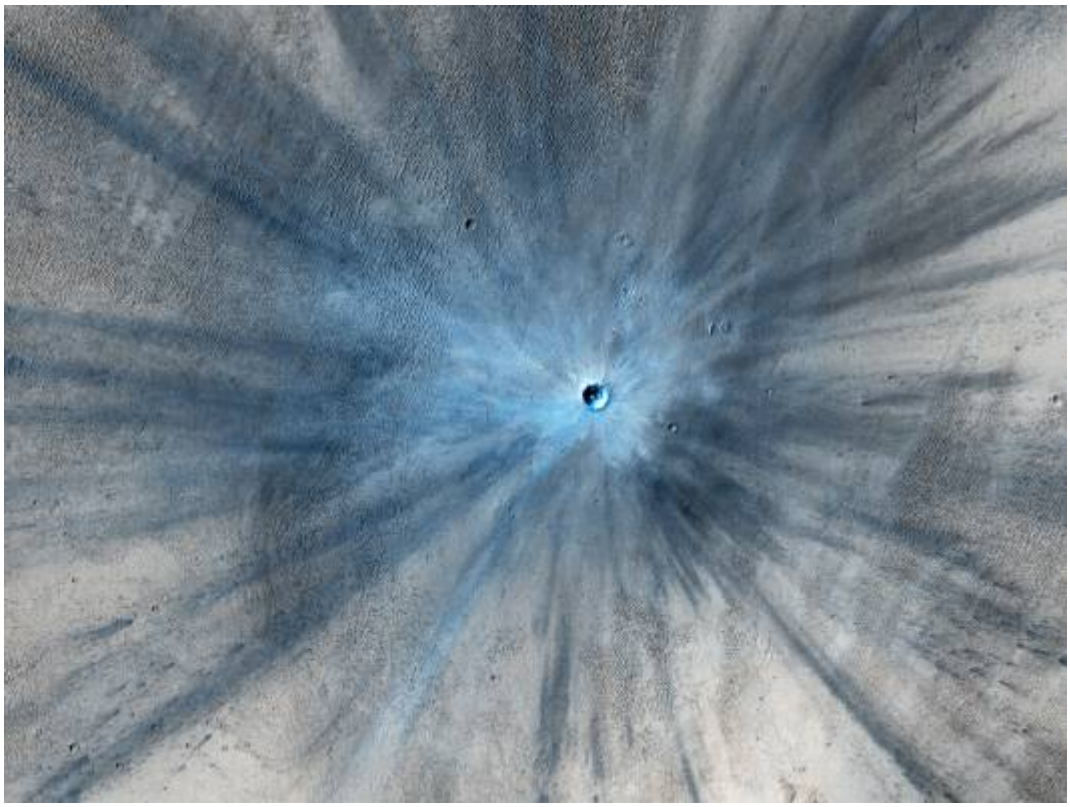
The person who took this on would work with Geoff during the build up to the Barcelona trip. They would not necessarily have to organise the detailed administration of any trip itself, nor would they need to be a member of the Steering Committee. Please think about this and see if you might be prepared to help.

We are now calling for those who might be interested in going to Brittany in September. At this stage we are looking for expressions of interest and hope to have a proper flyer available soon. Thanks to those who have already contacted me. An outline itinerary is attached to the email.

Finally, I am told that the new book on Herefordshire geology edited by John Payne is superb – I look forward to getting one. We will have a copy at the May meeting, if you want to see it. However, you can order it direct from the publishers - www.logastonpress.co.uk.

HIRISE

Well you wouldn't have wanted to be idly staring at the scenery when this arrived.



You can work out from the sharp edge of the crater that this is unlikely to be anywhere on this planet. It is in fact on Mars.

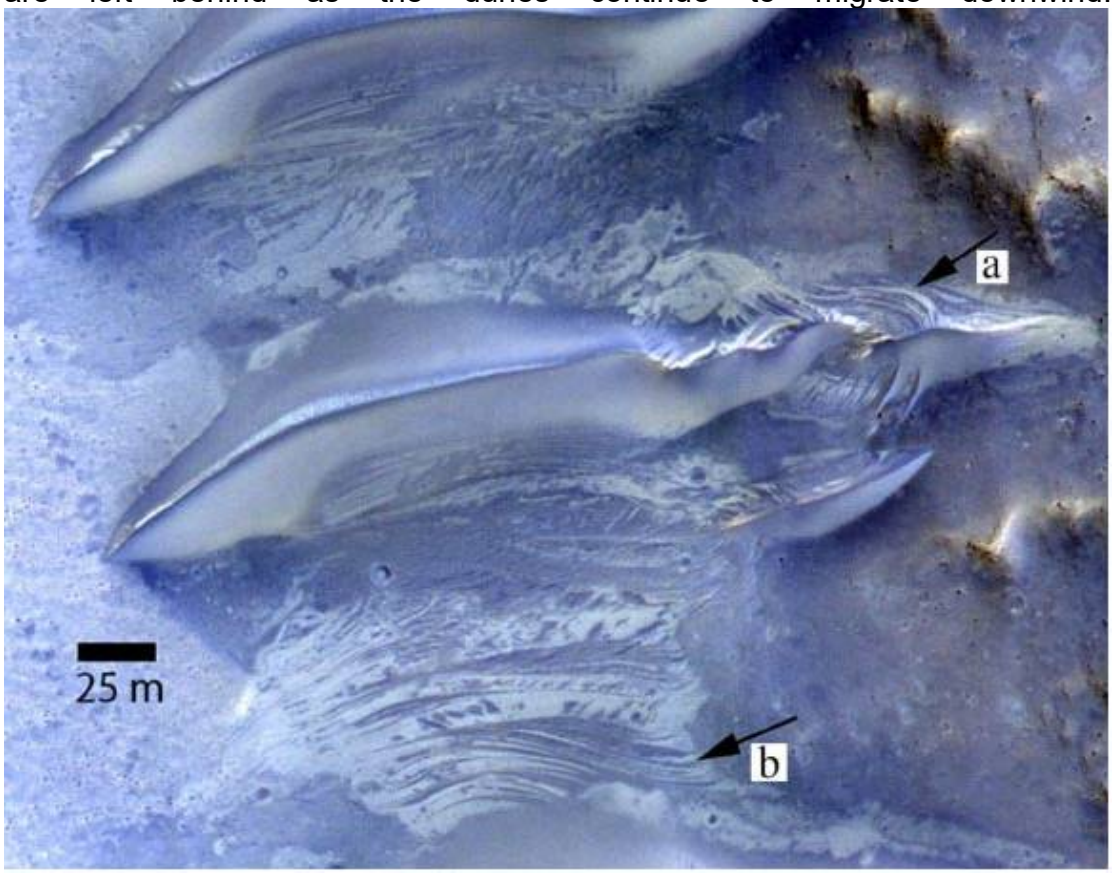
The HIRISE (HIGH RESOLUTION IMAGING SCIENCE EXPERIMENT) orbits Mars at an altitude of 300 Km and the quality of the camera is such that each pixel covers 30cm on the ground. It has produced some remarkable pictures. The image below is significant because it reveals evidence of Mars' watery past. The researchers focused their study on the 6-km-long, 0.8-km-wide pit valley in Lucaya crater, a 34-km diameter crater situated on the rim of the larger Huygens basin.

On Earth, desert dune fields are periodically flooded by water in areas of fluctuating groundwater, and where lakes, rivers and coasts are found in proximity. These periodic floods leave tell-tale patterns behind them..

When the images were scanned this same patterned calling card was recognised, suggesting that water had been present in the relatively recent

past. In a remote sensing study of the Namib Desert, the team had previously noted these patterns – 'arcuate striations' — on the surface between migrating sand dunes. Fieldwork subsequently showed that these arcuate striations resulted from dune sediments that had been geochemically cemented by salts left behind by evaporating groundwater.

These dune sediments later become relatively immobile, which means they are left behind as the dunes continue to migrate downwind.



A fictive flight above real Mars

This next HIRISE contribution has been made by morphing together hundreds of images so that they look like a video. You will recognise many earth-like features such as deserts, water erosion, impact craters, yardangs, and barchans; you'll also see some features that look distinctly alien.

The clip starts with a close up of the moon Phobos, and is initiated by clicking in the white box at the bottom left hand corner of the screen:

https://vimeo.com/207076450

Tsunamis on Mars

Tsunamis on earth, those huge devastating waves, are usually generated by earthquakes, but there is another rarer mechanism, a meteorite impact. Some recent research has indicated that the meteorite impact that created the

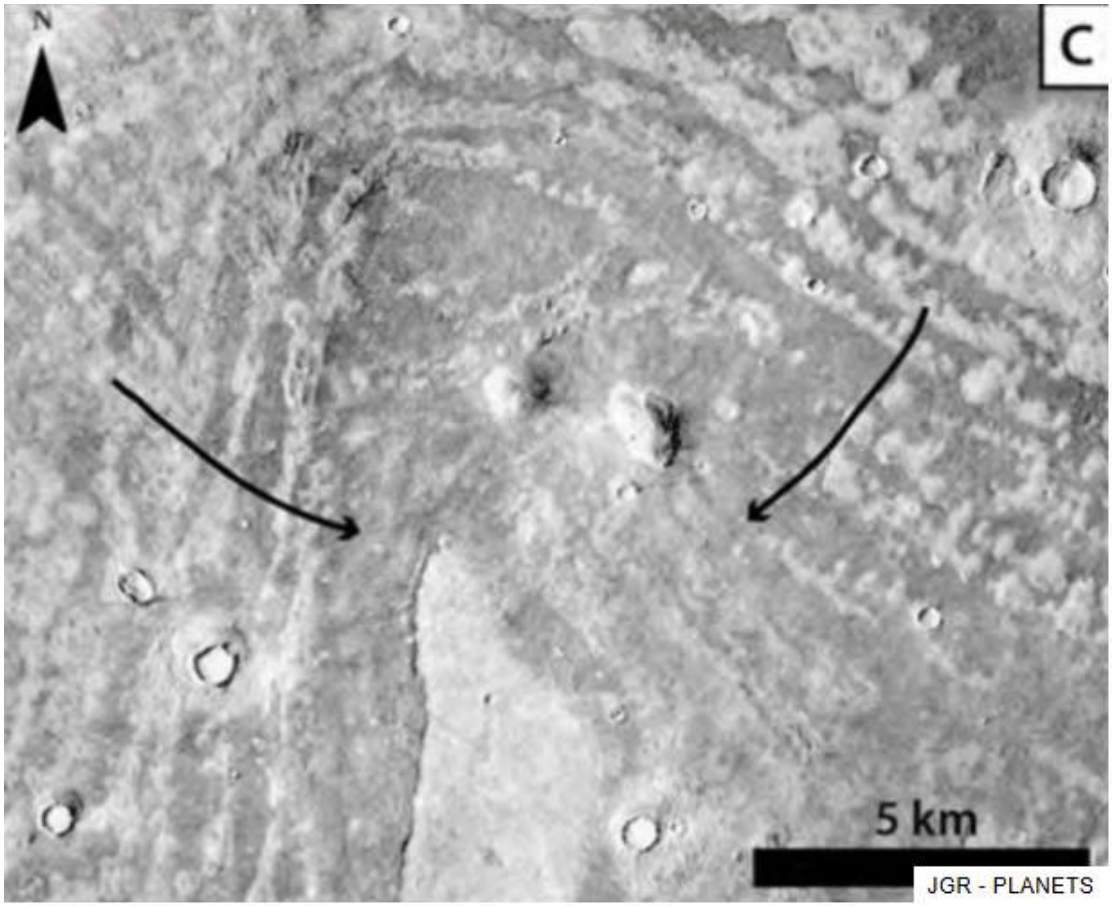
Lomnosov crater on Mars also created a giant tsunami. The feature is extremely degraded today, with a collapsed crater rim.

Two successive waves were formed during the event. It was a really large-scale, high speed tsunami. At the very beginning, a crater of 70km in diameter was created by the impact. This expelled a huge volume of water, with wave propagation velocity of 60m/second.

The initial wave was about 300m in height. After just a few hours, that tsunami wave reached the palaeo-shoreline located at a few hundred km from the impact crater. This gigantic wave washed over hills and plateaus and through valleys, leaving behind the lobate flow deposits.

Finally, due to the Martian ocean filling in that crater, which produced a kind of rebound, there was a second wave propagation. There's also a second set of landforms that we see along the coastline called thumbprint terrain, the reflection of the tsunami waves from the coast and their interaction with a second set of tsunami waves, would have resulted in sediment deposition that's very similar to what we actually observe on Mars.

An ocean on Mars three billion years ago, would have made the Red Planet a more hospitable place for life, raising hopes that signs of biology could be detected in the future.



Wham bang

There is a mountain of evidence that all the Planets in the solar system were heavily bombarded at various stages in the geologic past. And still it continues. The next image was captured by the Mars Rover and shows the ablated remains of an iron meteorite on the Martian surface.

But perhaps more bizarrely there are Martian meteorites here on Earth. A very energetic impact hurled rocks from the Martian surface so violently that they were ejected into space. At a later point they crossed the Earth's orbit and entered our atmosphere. And here is an example:

Rocks of the month

https://www.youtube.com/watch?v=bjMEIxuaDUA

Columnar basalt - It couldn't have happened at a worse moment

https://www.youtube.com/watch?v=qJWtgvsm_ms

The gallery

The geology of Anglesey covers a huge time span and is quite fascinating. Roger Hunt's picture is of South Stack, taken during our recent visit. The BGS describe the formation as Schistose greywackes with partings of mica-schist, or interbedded metasandstones, pelites and subordinate quartzites. Wow.

Please send us more of your geology images. Contact details follow.
photoresources17@gmail.com

The calendar

May	5	South Wales field trip (until 9th)
	10	Members' Meeting
	24	Area field trip: Lickey Hills
June	14	Local field trip: Hollybush/Raggedstone Hill

July	1	Visit: BGS Open Day
	26	Local field trip: Bromsgrove building stones (Evening)
August	30	Area field trip: Hergest ridge
September	19	Brittany field trip (until 29th)
October	11	Monthly Talk: Metal Mines of Spain
November	8	Monthly Talk: TBD
December	13	Monthly Talk: The Geology of the Malverns

Who's who?

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