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THE ELECTRONIC NEWSLETTER OF THE OPEN UNIVERSITY GEOLOGICAL SOCIETY MAINLAND EUROPE
AUGUST 2010

DEAR ALL,

In April I went to the AGM and Committee meeting in Coventry, where among the other branch organisers I was happy to meet some "old acquaintances" from former memorable field trips and symposiums. I got a warm welcome as the committee was pleased to see that the European Branch is still an active branch and wants to stay one.

How to get in touch with people interested to join our Society was one of the topics that was mentioned. With the demise of summer schools, it is more challenging to get in touch with OU students and, at the same time, there might be a greater necessity to offer them the opportunity to join field trips. This concern is actually one that we discuss within our Branch Committee along with how to recruit new members.

In this newsletter I would also like to thank the committee, Marion, Mike, Terry and Dave for all the support and work they did since last January. We communicate on a regular basis via email and share our ideas and comments. As it is difficult to meet most of you on trips, don't hesitate to get in touch with us if you want to share information about an event or about any other matter, geological matter of course!

I wish every one a sunny summer and maybe I will meet some of you in Swansea,

Elisabeth d'Eyrames

A NOTE FROM THE EDITOR

Dear readers,

I've recently come across something that caught my attention: a project to write at least one limerick for each word in the English language (more information on www.oedilf.com).
Plenty of geological terms have been explained in limerick form already - and I'd like to share one with you, because I find they are really fun to read:

Asthenosphere:

The asthenosphere really is not
An inviting or welcoming spot,
For it's frightfully deep
('Nuff to make the skin creep)
And the climate's oppressively hot.

Somehow this makes me look at familiar expressions in a completely new way...

Marion Seitz

IN THIS ISSUE

The Jura Field Trip

Of Romans, dinosaurs and good wine

The Jura field trip arranged by Elisabeth d'Eyrames, our branch organizer, included not only geology, but also archology, palaeontology and an introduction to an enterprising local wine maker.

The Jura is essentially a glaciated limestone strata distorted by tectonic plate movements. Till mounds (boulder clay) are visible as one travels around Arbois and Champagnole, where Elisabeth lives.

At the disused Mont Rivel quarry we found fossils among the debris at the face of the old workings; later we visited an area of extensive limestone pavements.

During our conducted tour of the Champagnole Archaeological Museum we saw exhibits from the Romans presence in Gaul. This was followed by a visit (accompanied by the museum archaeologist) of a Roman Temple site also at Mont Rivel. The area was only partially researched and, except for the temple foundations, covered over by soil until funds are available for comprehensive excavations.

One of the excursions organized by Elisabeth took us south of Arbois and Champagnole to Loulle. This small village is now famous following the serendipitous discovery by Jean François Richard in 2005 of dinosaur tracks on the floor of an old limestone quarry. As an aid to recognition, many of the impressions made by the dinosaurs are painted. The footprints (over 500 were eventually counted) were identified as made by sauropods, very large herbivorous dinosaurs. These trace fossils are around 150 MA, a period when the area lay between 30º and 40º N - about the present day position of Morocco.

Upper Jurassic dinosaur footprint site. Jean François Richard (r.) points out the footprints of a sauropod.

Fossilized coral (photographed by Yelena McTague)

We spent a very pleasant time at the wine cellar of M. Pascal Clairet in Arbois, and later went to the sunny slopes where his grapes were growing.

Included in the exceptionally well planned and very enjoyable weekend was a barbecue hosted by Elisabeth. Towards the end of the evening Yelena, one of the youngest participants, sang and played her guitar for us.

Peter Whiteley,
Photographs Claire McTague

Vertical limestone walls of the "Horseshoe Circle", source of the Cuisance river and boundary to the "Reculée des Planches"

LE ROCHER DE PRADES

Volcanic structures in the Auvergne

Last July, Claire, her daughters, my son and I joined in on a geological fieldtrip organised by a French University around Puy en Velay in the Auvergne. Not surprisingly volcanoes were the main subject as alone in the Devès area, west of Le Puy, 330 volcanoes have been counted. During these couple of days we have visited all sorts of volcanic structure relating to strombolian cones, phreato-magmatic deposits, phonolitic and trachytic extrusions, and basaltic flows. I will comment two pictures that illustrate two different eruptions.

The first picture has been taken west of Le Puy in the valley of the river Allier; the landscape feature is called “le rocher de Prades”. This spectacular structure is due to the accumulation of basaltic lava over phréato-magmatic deposits and trapped within a maar. Above the very regular organ pipes there is a massive entablature which relates to the top part of the flow displaying an irregular arrangement of columnar jointing. The bus gives the scale of the thickness of the flow. This event is part of eruptions that took place between 4 and 1 Ma ago, along NNW-SSE fissures in the Variscan basement, gradually building up the basaltic plateau of the Devès area.

Le rocher de Prades, Auvergne

The second picture taken 15 km further away, shows layers of material that accumulated during a phréato-magmatic eruption on the plateau of Limagne.

That means that the magma on its way up encountered a river, lake or groundwater. If the ratio water/magma is too low, the energy stays comparably low and a strombolian cinder cone builds up.

If the ratio is too high, it is similar to a submarine eruption when pillow-lavas form. When the ratio is “right” (mass ration water/magma approx. 12), then energy released is the highest and the steam and melt mixture explodes, scattering the material in a ring shape called maar. Sometimes a lake settles in the middle of it.

This type of eruption is also called Surtseyan since the birth of the Surtsey island in Iceland.

Maar of the Limagne swamp

The crumbly outcrop on this photo shows the faults in the ring of the maar, which relate to the collapse of the centre of the volcano after the eruption. Among the ejected material we found lapilli and “cauliflower” shaped bombs of juvenile basalt characteristic of that type of eruption, fragments of rocks through which the magma erupted like fragments of basaltic flows, scoria and variscan basement. Most interestingly for the one that like good looking specimens, we picked up plenty peridotites from the mantel. The girls were really good at spotting them.

Thanks to Hervé Bertrand (CNRS Lyon) for the outstanding explanations, to Danièle Ponchaux for the organising and to Claire McTague for the photos!

Elisabeth d’Eyrames

Esker Riada and Irish Heraldry

When I am travelling with Christian, Sigi and Rolf, they display great tolerance with me when ever we stumble across anything which is remotely of geological interest. My trip to Ireland with Christian and Sigi was no exception, but the geology seemed at first to be very limited. We planned 4 days walking along, over and around the Sheep's Head Peninsular, which lies to the south of Bantry Bay, followed by a visit to Killarney and Tullamore on our way back to Dublin. Rolf decided, probably very wisely, not to join us. Since any of us can slip effortlessly into the role of either Stan Laurel or Oliver Hardy, its not surprising when many of our outings suddenly appear like a scene from a classical Laurel and Hardy film. The Ireland trip started like one at Munich airport and was still continuing when we tried to reach Dublin airport for our first attempt to fly home.

The apparent lack of geology was not due to any shortage of such in Ireland, on the contrary, the problem was the lack of local knowledge, without which, looking for interesting outcrops becomes a complete lottery. Much of southern Ireland and almost 100% of the Sheep's Head Peninsular consists of 'Old Red Sandstone' from the Devonian. On the peninsular, this looked decidedly grey and only displayed anything of its true colour at very fresh exposures. The grey colouring was more frequently tinged green, where hydrothermal fluids containing copper had permeated into the sandstone. On one walk around the end of the peninsular, we passed the ruins of a copper mine which had been working around the time of the Irish potato famine in the middle of the 19th century.

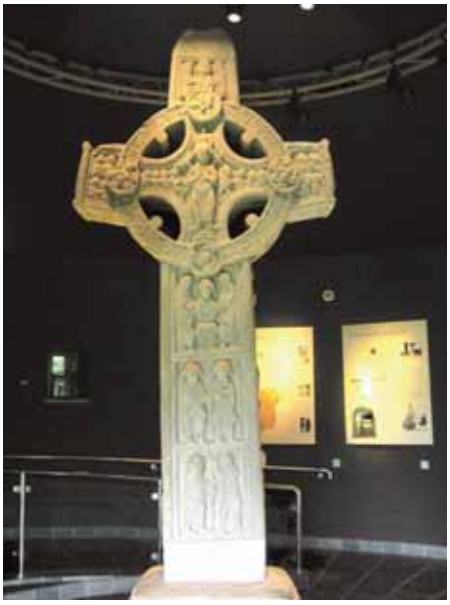
Our first 5 nights on the peninsular, in the Seamount Farm B&B, were excellent but eventually we needed to head for Killarney. Unfortunately, the weather was unkind on this day and so very little was seen of the lakes and our trip across the eastern end of the 'Ring of Kerry' through Macgillycuddy's Reeks, was also cancelled. Things were compensated for by finding a B&B close to Killarney town centre and a good recommendation on where to eat. Since this location could be reached by foot, there was no artificial limit set on the amount of Murphy's stout which we could consume. Our host also gave us a very good tip for the rest of the drive back to Dublin. In typical Irish manner, he made no attempt to discredit Tullamore, but he made it clear that the town of Birr had more to offer and that we would find as many of my lost cousins there, as in Tullamore. More about them later.

The great telescope Birr castle

The castle in Birr is surrounded by one of the finest gardens in Ireland, in the early 1840s the owner, the third Earl of Rosse from the Parsons dynasty, designed and built the largest telescope in the world at that time, making Birr the centre of most of the advanced astronomical work for over 70 years. Another talented member of the Parsons family, Sir Charles Parsons invented the steam turbine in Birr castle, in 1884.

By selecting Birr as our overnight stay on the way back to Dublin, we were able to visit the ruins of Clonmacnoise monastery, founded in 548 by St Ciaran on the banks of the River Shannon at the junction with the 'Esker Riada'. A highly strategical position as the 'Esker Riada' and the River Shannon had formed the two main communication arteries in Ireland, since prehistoric times. Even if you have never visited Clonmacnoise, you are almost certain to have seen photos of monastery ruins, such as the towers built as a retreat for the residents when they were threatened by pillaging Vikings, with the door some 5m from the ground, or the fine examples of the Clonmacnoise Celtic crosses.

Clonmacnoise Round Tower and the Shannon.



Celtic cross from Clonmacnoise

It was my first intension in this article to pontificate about 'eskers', when I remembered something written for a prehistoric issue of the OUGS ME Newsletter, by Paul de Schutter in his 'Rock-on' column. This contribution is still accessible on our website today. Paul not only explained what an esker is, he even mentioned the 'Esker Riada' in his article, more or less making what I had to say completely redundant and I nearly dropped the idea of writing anything. However, there was one point in Paul's aricle which left me no peace.

I will resist both from copying his text completely or simply asking you to refer to it, instead I have selected some of the more relevant passages. Firstly, Paul explains what an esker is and where the name originated:

"The word Esker is derived from the the old Irish Gaelic eiscir, meaning "ridge of gravel", and it refers to sinuous, narrow, steep-sided ridges composed of irregular stratified drift, deposited in contact with glacial ice in either an open channel or an enclosed conduit (Drewry, 1986). Eskers are therefore glacio-fluvial landforms: ancient river beds, formed by glacial meltwater flowing in channels along zones of weakness in or beneath glaciers or ice sheets. In general, esker deposits are very similar to regular fluvial deposits. The sediments range from cobbles and boulders in high flow-rate areas, to fine grained laminated deposits in areas of low discharge, where both parallel and crossbedded lamination can be present".

On the 'Esker Riada', using the Gaelic name, Paul wrote:

"Apart from their geological interest, eskers have also long had a very practical value. As they are mostly made up of highly porous sand and gravel and thus are well-drained, they have been used since prehistoric times by humans - as well as animals - as natural elevated roadways (a famous example is the Eiscir Riada in Ireland, still carrying the N4/N6 from Dublin to Galway in some places), allowing safe passage through surrounding bogs and wetlands".

That could have been the end of this article, except the following text writen by Paul:

"Eskers can be broad and flat-topped, or have a single or multiple crest. They are often discontinuous, as sediment is deposited only in places where the meltwater slows down. Eskers generally follow the trend of their parent glacier (parallel to the ice flow)".

The last sentence that eskers generally follow the dierctional trend of their parent glacier (parallel to the ice flow) left me no peace. It is generally accepted that the Irish ice cap formed as a south-westerly extension of the Scottish ice cap, this is reflected by the orientation of most of the large inland lakes and lochs in Ireland. It is also generally accepted that deglaciation occurred from south to north. In this case, the 'Esker Riada' should run through Ireland, from north to south and not from east to west.

I think I found the answer to this contradiction in the following article:

Origins of the Ice-contact Stratified Ridges (Eskers) of Ireland [William P. Warren (1), Gail M. Ashl / Journal of Sedimentary Research, Volume 64a, 1994]

The authors offer the following explanation for the origin of the Irish eskers which also questions the simple model of deglaciation from south to north:

"An extensive system of ridged landforms composed of ice-contact stratified sediment was deposited in the central lowland of Ireland during the most recent deglaciation (< 18,000 BP). The ridges have been interpreted by others as deposits of an ice-sheet drainage system (i.e.,"eskers") and as such have been used with other data to reconstruct the deglacial history. The traditional deglaciation model shows systematic retreat of ice from south to north. Our study, which involves an analysis of the ridged landforms using lithofacies, sedimentary structures, and paleocurrent data in conjunction with the geomorphology, indicates that the pattern and nature of the ridges are not compatible with this model and support a new model of deglaciation (Warren 1991) in which the "esker" system formed in an interlobate

area during the simultaneous shrinking of two main glacial outflow centers. An extensive lake system developed in the lowland between the two outflow centers. Ridges formed both perpendicular and parallel to ice margins, involved both active and stagnating ice, are both continuous and segmented (beaded), and were deposited in subaqueous and subaerial environments. Almost all of the ridges are associated with lacustrine sediments. Ice-contact ridges are polygenetic, and a genetic classification is proposed. Those that formed perpendicular to the ice margin are termed eskers; those that formed parallel are termed moraines. Distinction between esker types (continuous or beaded subglacial tunnel fills, fluvial ice-channel fills, and subaqueous fans) and moraine types (subaqueous or subaerial) is crucial to a reconstruction of the mode and pattern of deglaciation in the central Irish lowlands."

This article may dispute the simple model for deglaciation from, but the definition it suggests for eskers is compatible with the east-west orientation of the 'Esker Riada'.

Esker / wikipedia.com

As for the Molloy's...

What of the lost Molloy cousins? Before leaving for Ireland, I had supplied Christian and Sigi with a copy of the O'Molloy family chronical, back to the 12th Century, and a copy of the O'Molloy or O'-Maolmhuaid coat of arms, with strict instructions to learn everything by heart, prior to entering the family demesne, in County Offaly. When we arrived in Birr and parked our car, the first two establishments with 'MOLLOY' above their doors, were closed and boarded-up. Clearly both had gone bunkrupt. I had a wretched evening in Birr, the 'Schadenfreude' acted out by the Bavarian contingent knew no limits, the honourable mention that the O'Molloys received in the audio/visual introduction to Clomacnoise the next morning was a minor compensation, but it was too little, too late.

Mike Molloy
(text and photographs)

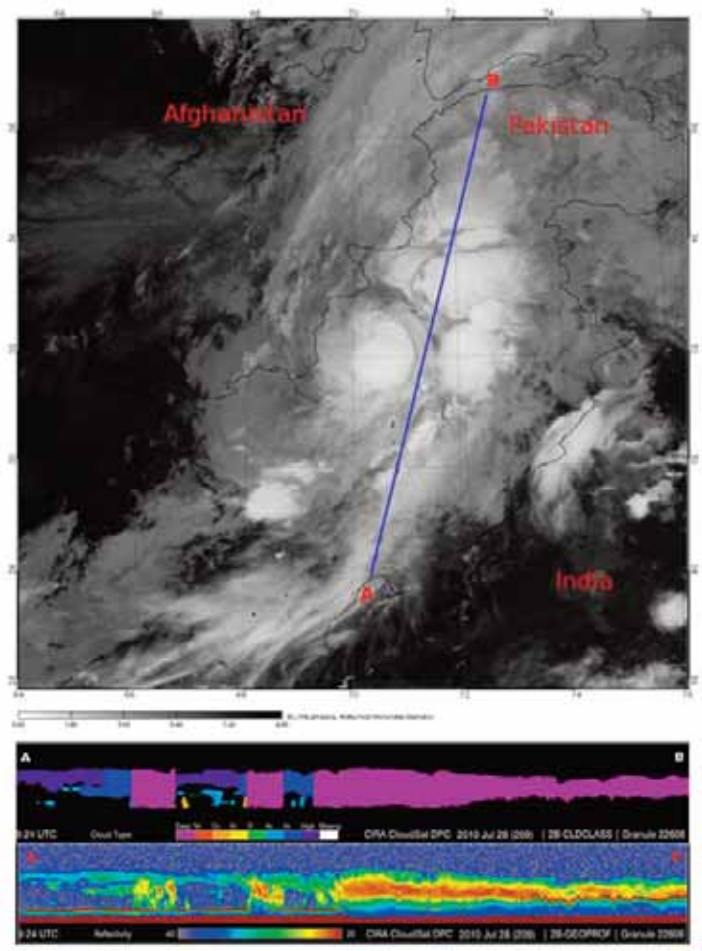
NASA Images Show Anatomy of Pakistan Flood Disaster

In late July 2010, flooding caused by heavy monsoon rains began across several regions of Pakistan. According to the Associated Press, the floods have affected about one-fifth of this country of more than 170 million people. Tens of thousands of villages have been flooded, more than 1,500 people have been killed, and millions have been left homeless.

NASA's CloudSat satellite captured the genesis of the flooding event as it flew over the region on July 28, 2010. At that time, a large area of intense thunderstorms covered much of Pakistan. Between July 28 and 29, up to 400 millimeters (16 inches) of rain fell from these storm cells, triggering flooding along the Indus and Kabul Rivers. Storms with similar structures to this one have become common this summer as tropical monsoon moisture, coupled with a strengthening La Nina (which has different effects around the world), dominate this region's weather patterns.

A series of five NASA images shows the anatomy of the flood disaster:

>CloudSat Spots Beginning of Pakistan Floods



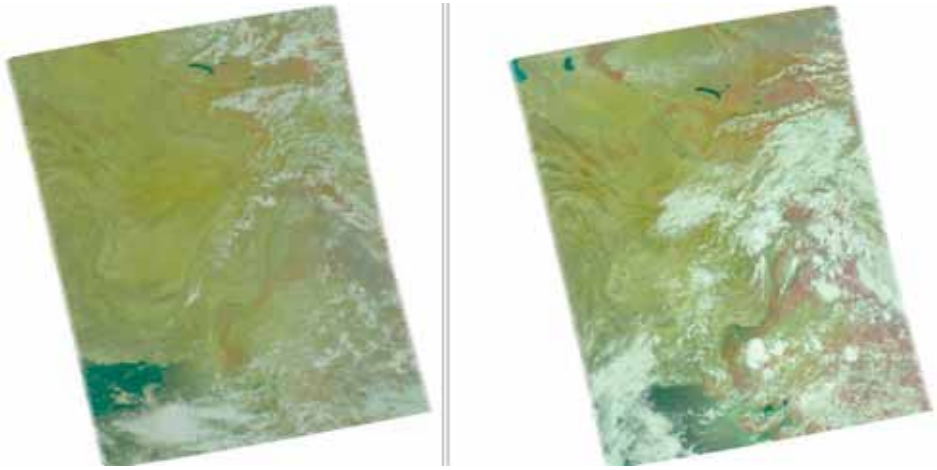
NASA's CloudSat captured the early genesis of the Pakistan flooding on July 28, 2010.

This image, from NASA's Moderate Resolution Imaging Spectroradiometer instrument on NASA's Aqua spacecraft, reveals the bright white cloud tops from the cluster of thunderstorms. The blue vertical line across the image represents the path of CloudSat at the time the MODIS image was acquired. CloudSat cut through a large thunderstorm cell in the northern section of the country.

As seen in the top half of the bottom image, CloudSat classified the majority of the clouds present at the time as deep convective (cumulonimbus) clouds, which are typical of thunderstorms. The bottom half of the lower image shows the 3-D vertical structure of the storm along the satellite's flight path, revealing its heavy precipitation. As CloudSat's Cloud Profiling Radar passed over the area of heaviest precipitation, its signal thinned significantly. By the middle of the image, the ground echo (horizontal red line), which represents the topography of the area, completely disappears. The thinning of the radar's signal occurs because larger-sized particles and heavy rains decrease radar reflectivity and become indistinguishable to the radar. As the satellite continued travelling north, rainfall rates decreased and the signal increased, allowing the ground echo (topography) to once again become visible, at the far right of the image.

IMAGE CREDIT:
NASA/JPL/The Cooperative Institute for Research in the Atmosphere (CIRA), Colorado State University

> 10 August

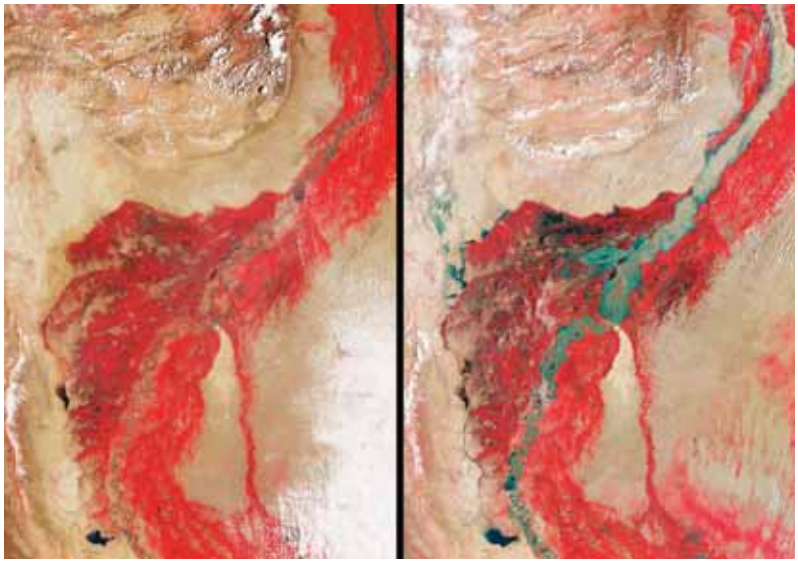


These two false-color images of the region were taken by the Atmospheric Infrared Sounder (AIRS) instrument on NASA's Aqua spacecraft, using the instrument's four visible and near-infrared channels.

The images include southern Pakistan, including the Sindh Province. The Indus River appears to enter from the upper right and winds southwestward toward the lower left. The image at left was taken before the flooding on July 9, 2010, while the image on the right was taken Aug. 10, 2010. Both were taken at 1:30 p.m. local time. The spatial resolution of the images is 14 kilometers (8.5 miles), and each image covers an area measuring 1,650 by 1,980 kilometers

IMAGE CREDIT:
NASA/JPL

> 11 August

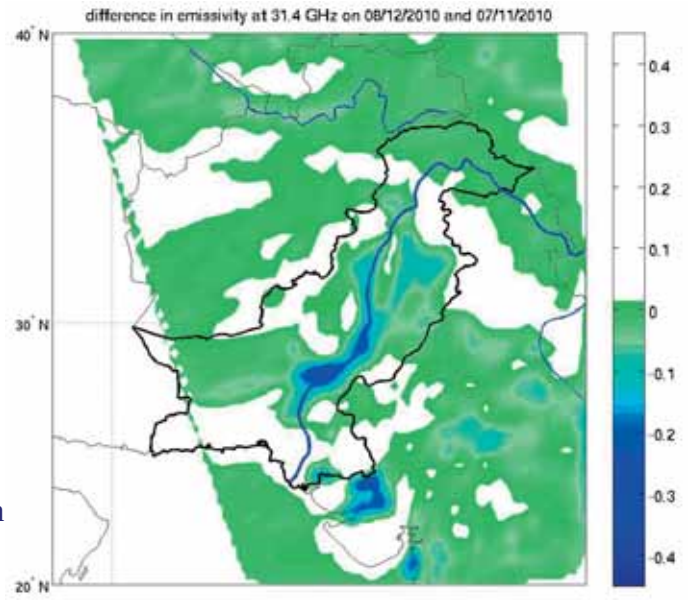


This image pair of the affected region was acquired by the nadir (vertical-viewing) camera on the Multi-angle Imaging SpectroRadiometer (MISR) instrument aboard NASA's Terra spacecraft. The image on the left is from Aug. 8, 2009, and the one on the right is from Aug. 11, 2010. These false-color views display the near-infrared, red and green bands of the instrument as red-green-blue. This distinctly highlights the contrast between the water and vegetation on the river banks, because vegetation appears bright in the near-infrared region of the electromagnetic spectrum.

The region of southern Pakistan shown here includes the Sindh Province. The Indus River can be seen snaking across the image from lower left to upper right. The feature near the bottom and left of center is Manchhar Lake. Water is apparent in shades of blue and cyan, though sediment content can add a tan color, as in the upper right. Clouds appear white. Dimensions of each panel are 300 by 425 kilometers (186 by 264 miles). In the image from 2009, the Indus is typically about 1 kilometer (0.6 mile) wide. In the 2010 image, the river is 23 kilometers (14 miles) wide or more in spots, and flooding in much of the surrounding region, particularly in the Larkana District to the west of the river, is very evident.

IMAGE CREDIT:
NASA/GSFC/LaRC/JPL, MISR Team

> 12 August



This image shows how surface emissivity (that is, how efficiently Earth's surface radiates heat) changed in the affected region over a 32-day period between July 11 (pre-flood) and August 12 (post-flood).

This image was created using data from the Advanced Microwave Sounding Unit instrument, which flies on NASA's Aqua spacecraft as part of the Atmospheric Infrared Sounder (AIRS) instrument suite. Surface emissivity, in this case in the microwave region of the electromagnetic spectrum, depends strongly on what type of surface is present. For dry land, it is high, close to 1 (land radiates heat very efficiently), while for water, it is quite low, less than 0.5 (water tends to retain heat better than land). The image shows that the emissivity has dropped by up to 0.4 in large areas surrounding the Indus River, indicating that these areas are almost completely under water.

IMAGE CREDIT:
NASA/JPL

> 18 August

The Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER) instrument on NASA's Terra spacecraft captured this cloud-free image over the city of Sukkur, Pakistan, on Aug. 18, 2010.

Sukkur, a city of a half-million residents located in southeastern Pakistan's Sindh Province, is visible as the grey, urbanized area in the lower left center of the image. It lies along the Indus River, Pakistan's longest, which snakes vertically from north to south through the image and is the basis for the world's largest canal-based irrigation system. As reported by the British Broadcasting Corporation, Sukkur is one of the few urban areas in the region that has thus far escaped widespread destruction from the flooding, which has affected an estimated 4,000,000 people in the province. Relief camps have sprung up across the city to house some of these displaced people. The land along the Indus River in this region is largely agricultural, and the flooding has taken a heavy toll on the region's crops and fruit trees.

The ASTER image is located at 27.8 degrees north latitude, 68.9 degrees east longitude, and covers an area of 62.4 by 77.6 kilometers (38.7 by 48.3 miles).

IMAGE CREDIT:
NASA/GSFC/METI/ERSDAC/JAROS, and U.S./Japan ASTER Science Team

INTRODUCTION AND CAPTIONS
Nasa: http://www.jpl.nasa.gov/news/news.cfm?release=2010-274&cid=release_2010-274; accessed last on September 1, 2010