Geological Remote Sensing Group

Newsletter

Issue 40 December 2004

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AIMS OF THE GRSG

This specialist Group, affiliated jointly to the Geological Society of London and the Remote Sensing Society, was founded in 1989 to foster and raise awareness of the use of remote sensing and related techniques within the geological and geophysical communities.

We feature a good working relationship between industry, government and academic organisations resulting in a balanced scientific, technological and commercial viewpoint.

Membership is £10/$20US personal, £6.00 Student or £100/$200 corporate. Advertising is welcomed (contact Newsletter Editor) - Charges are £40 per full page per issue or £110 for the year, £25/£75 per half page and £12.50/£30 per quarter page.

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Merry Christmas

And a

Happy New Year

from the GRSG Committee

EDITORIAL

Having spent six weeks prospecting in the wilds of west and east Greenland during August and September this year I returned to a new post within the GRSG committee. Naz has moved to secretary and I have filled the vacant post of newsletter editor.

I find myself taking on the reigns as editor at a particularly interesting time. The last two newsletters have developed a discussion on the changing times of a geological remote senser. In this issue Geoff Lawrence replies to Philippa's editorial in issue #39. Also, this issue's feature article by Peter Martin-Kaye, honorary GRSG member, asks the question "What's Happened to Remote Sensing?" (see page 7). This question parallels a number of articles published in the Geological Society's Geoscientist magazine relating to the demise (or near extinction) of fieldwork in geology.

Public awareness of remote sensing is improving with imagery being used for news reports e.g. high spatial resolution images of Baghdad and perspective views of the weather map on the BBC. Also, the news coverage of NASA and ESA's recent missions to Mars has brought planetary remote sensing imagery into the living room. In this issue there is an update article on planetary remote sensing focusing on missions to Mars and Saturn.

Many of you will be aware, from previous newsletters, about the GRSG web forum. However, the use of this facility is relatively poor (there are only 27 registered members as of 27th November). Online e-mail and web forums are a useful way of exchanging information and an ideal way for GRSG members to catch-up on new sensors, software and gossip! For those of you that aren't signed up go to www.grsg.org and click on Newsgroup. See page 17 for further details.

The RSPSoc Aberdeen Conference features heavily in the meeting reports section. Many thanks to Karen, RSPSoc secretary, for sending me the abstracts for this meeting at very short notice. Abstracts from this year's GRSG AGM will feature in the next newsletter.

In the next issue there will be an update on New Sensors, Software Updates and Geological Tenders (a new section introduced by Naz). If anyone has information relating to these sections then feel free to pass them on to me. Finally, in this issue the new editor requests articles, information, meeting reports and gossip! (See page 3). Photos of GRSG members in the field or elsewhere (subject to censorship) will be gratefully received.

Diolch yn fawr
Nadolig Llawen a Blwyddyn Newydd Dda

Alex Davis

CHAIRMAN'S MESSAGE

Season's greetings! It has been a busier than usual autumn for the GRSG, so the Yuletide vacation will be particularly welcome. We continue to be one of the more active SIGs of the Remote Sensing & Photogrammetry Society. This year there were special GRSG sessions at the RSPSoc annual conference: given the Aberdeen venue, we had a natural resource theme, with sessions on exploration and environmental impacts. For our annual conference we're back at the home of our other parent body, the Geological Society of London, with a two-day meeting on mapping hazardous terrain. I'm writing this a couple of weeks beforehand, but it is shaping up to be one of our largest and most international conferences, with presentations on features in Africa, the Americas, Asia, Australasia and Europe.

There have been some initiatives on GRSG funding over the past few months. For starters, the membership rates have been reviewed and found to be insufficient to cover GRSG costs (primarily the newsletter production and postage). Given that the membership rates have been held constant for many years now, the GRSG Committee decided that a small increase in fees was needed. For Corporate Sponsors, we've kept the same fee for small companies, but have doubled the fee for those with over 10 employees. A couple of years ago we decided to support our student members, encourage research and hopefully attract more student members, by offering a couple of Student Stipends of up to £250. NPA Group have generously offered to sponsor both student awards, one focused on the geohazards/engineering geology sector, the other for the Earth resource and exploration sector. Discussions are ongoing with Infoterra, who are considering similar "high profile" sponsorship of the GRSG.

GRSG activities have been boosted by other sponsors: a number of publishers (notably Taylor & Francis, Kluwer and Springer) will be inserting publicity material into our conference packs and Newsletter – the resulting monies are not huge but are still very helpful. Arup have offered to contribute £250 towards colour prints in the book that will result from the mapping hazardous terrain conference (a Special Publication of the Geological Society of London). SassolChevron have stepped in to cover the cost of the Abstracts volume for the hazardous terrain meeting. A big THANK YOU to the new GRSG sponsors mentioned above - as well as to our stalwart Corporate Sponsors – building up a stronger financial base allows us to maintain our services to the GRSG membership, as well as opening the way to new initiatives.

Finally, many thanks to the GRSG Committee: it's a pleasure to work with such an effective and enthusiastic team! Thinking of the committee, congratulations and best wishes to Claire Roberts, former GRSG Secretary and Newsletter Editor, on the birth of a baby daughter in November. And last, but not least, congrats to Alex Davis, on taking over as Newsletter Editor and producing a bumper Xmas edition in time for distribution at the AGM...

GROUP & MEMBERS NEWS

Newsletter

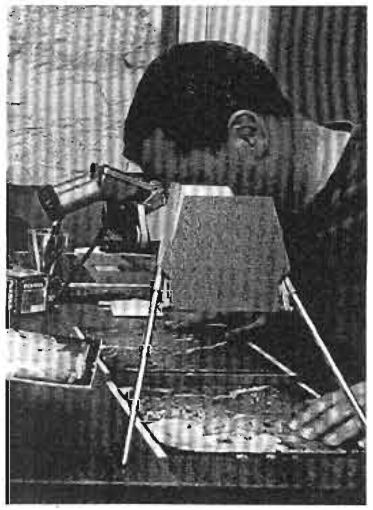
The new editor would like to invite the membership to send in articles and information to be included in future additions of the newsletter. Feedback from the membership indicates the value of the GRSG newsletter. The content, quality and thickness of the newsletter is dependent on the articles that we receive. We are able to at the moment report on conference meetings and include abstracts. However, looking at the GRSG newsletter archive from the early days there were fun reports from fieldwork around the world. So, if you've just come back or are planning to go on fieldwork, or are going to a conference then please consider writing a short resume of your trip. Also, the GRSG is fortunate to have many overseas members and I encourage you all to send in a "Postcard from abroad" type article outlining remote sensing geology activities in your part of the world.

Recent GRSG newsletters have included lively discussions on the current state of Geologic Remote Sensing. If you have any thoughts or views on any related or other issue then don't hesitate in sending them to me. Send all articles / views etc via e-mail to Alex Davis at:

a.m.davis@imperial.ac.uk , or contact your nearest committee member.

Caption Competition

To start the ball rolling the following image is a picture of the editor using a stereoscope on his latest Geojob in Greenland. The best captions will be printed in the next newsletter. Hopefully there will be a funnier photo to use from the readership for the next issue!



Lively Debate Continued

Reply from Geoff Lawrence with respect to Philippa Mason's editorial in Issue 39.

Oops! Sorry Philippa!

If there's one lesson I've never learnt, it is I shouldn't expose my musings and ramblings to public scrutiny! And not just because of my torturing of English grammar. I'm sure other GRSG members can remember other comments I should have kept to myself.

So, sorry Philippa, about the male-female GPIC controversy. Of course, there was zero scientific rigour to the comment. And certainly I didn't want to infer, nor believe there is any, difference in performance in male-female picture processing and interpretation or earth science skills. Utter nonsense indeed! The observation was supposed to be limited to a musing what deep-seated perception our brains use to determine pattern-recognition on maps and images.

You do have to wonder about whether there are differences in perception, of what is displayed on maps and satellite pictures, in minds that are totally untutored in earth science and only mildly exposed to geographic information. I talked about the Earth from Space for a science lesson at our local Primary school last week. I showed Landsat and SPOT satellite pictures of UK and Australia to a group of thirty-one eight and nine year olds. 18 girls and 13 boys. In response to the question about McDonnell Ranges in central Australia, on a Landsat picture, where are the valleys and the hill tops? (i.e. decide topographic "way-up") only 16 children identified valleys correctly, of which 11 were boys. Not scientific, prejudiced, inconclusive? All of those. but it always seems this way whenever I have asked!

When I turned the picture upside down, as we expect, other children could perceive the proper topography, and some "lost" the right perception: 12 boys and 3 girls. So, my prejudice suggests boys and girls perceive "topographic way-up" differently. That's all. I didn't spot any differences in how boys and girls recognised cultural features on pictures and accompanying maps: fields, roads, towns, rivers, except a hint the girls were more analytical, thoughtful and accurate in their description of features and commented more completely on how features are linked, i.e. the girls seemed to have better conceptual skills. This, my teacher-wife (who, by the way is almost fully recovered, and says thanks for good wishes) tells me, would be matched in most subjects for children of this age.

I also talked about oil pollution at sea. Immediately following, the children examined an Envisat radar picture of the Prestige tanker massive pollution slick off Spain. When asked if they could spot the "oil", 14 girls answered correctly and 9 boys. Again, I'd expect this; girls do seem to listen and grasp ideas presented to them better. One boy, recalling the rivers on the Landsat I guess, thought the long pollution slick was a river, not a bad spatial perception really.

As Philippa suggests, the boys are more forward ("me, me, me, I know Mr.Lawrence", sort of thing!) in presenting what they think, and hence helped more of them to "shout" when they saw the valleys properly once the picture was reversed!

So, is this all complete prejudiced claptrap?

And, thanks, Naz, for reminding us of that 1991 Spanish field trip.....reading about it brought the good memories back! Hope we can do another soon! Boys and girls perceiving and bravado-ing equally!

Geoff

FEATURE

What's Happened to Remote Sensing?

Peter Martin-Kaye GRSG Hon. Member
5 October 2004
phamkaye@aol.com

Emerging from retirement slumbers to look at the latest GRSG Newsletter I became seized with the feeling that something has gone seriously wrong with big bits of Remote Sensing. Or at least in the UK and in geology. I know that the British Isles, all covered in glacial drift and concrete, is not much of a place for geological RS but it seemed as if nothing is happening at all. A meagre handful of service companies based out in the sticks. Mention of a couple of EU jobs in half-hearted terms that suggest nobody was likely to be interested. And yet a few days previously there was the Photogrammetrist's RS meeting in Turkey. There were hundreds of delegates and the programme alone was 82 pages! But here....where has everybody gone?

Well, maybe it's understandable in geology, a profession that even it's professional institution is doing away with, but it's got to be different for Landuse and natural vegetation, hasn't it? There's a lot of land being used here, with things being built on it or being globally warmed off it, and usage constantly shifts. We've got to know what's going on of course. RS is the obvious way to get a good handle on it. In any case, everybody knows that every bit of the environment is under every conceivable sort of threat. That's what we're told, and we naturally believe it so we must be closely monitoring it all. In this 21st Century, us aficionados are able to rest assured that RS is on watch to alert us to anything going really wrong.

After all, when LANDSAT went up over 30 years ago we all saw at once that it was just the thing for regional inventory and monitoring. This is what it was for. LACIE (The Large Area Crop Inventory Experiment) was designed to do this very thing: watch Russian wheat crops. If the harvests were poor and the Soviets had to buy in grain there could be a degree of relaxation over the other sorts of silo. I myself did one of the first LANDSAT jobs in Europe: a 1:1,000,000 geological interpretation of the entire country of Ethiopia in about 3 weeks.

As time went by all sorts of improvements were rather quickly made in imaging systems and processing. RADAM, SEASAT and SIR-A showed what could be done with the radars. The ATM had opened the door wider on multispectrality. When I shuffled into the sunset in 1986 airborne operators were on the verge of offering dozens of channels in ground resolutions of 6, 4, even 2 metres. We thought that we were close up to automated thematic mapping. All sorts of interesting things had been done: multitemporal processing, multispectral radar simulation, radar/passive synergisms, multivariate correlations, GIS, anything else we could think of. Twenty years later, nearly, in 2004, landuse inventory would of course be using most of it as routine by now. Or would it?

I had an immediate opportunity to find out. The South West Regional Assembly of the parts where I now live was about to launch a Strategy for the Environment (of the South West) with a glossy affair in Ilfracombe with plenty of brochures and a free lunch. I got myself a ticket to see how it was all being done in the 21st Century.

There were about 200 delegates from every agency and quango you could think of and a good few more, representing, one might think, every conceivable sort of environmental wisdom. I was rapidly enlightened. The presentations were of astounding non-relevance and it became clear that this was a grand non-event, no more than the airing of a factotums' charter and hobbyists hymnal, thoroughly unprofessional and Victorian albeit dolled up prettily enough. There was no mention of baseline inventory, routine monitoring, remote sensing, scarcely anything of GIS, few people had heard of Intergraph systems let alone contemplated using one. Populist special interests got amazing attention, but large slabs of the region got none at all.

What had happened to the National Land Use Inventory? Where did that figure? Not at all, it seemed. In the 80's the NLUI had been in trouble from the huge number of categories fecklessly foisted upon it. But surely that would have been sorted out by now, wouldn't it? Apparently not. I discovered that the work had been given another name, LCM 1990, (Land Cover Mapping) run out of the governmental Monks Wood place, and then by LCM 2000, also run by Monks Wood. This was overtaken by CLORICE, a EU Europe-wide project using 2001 LANDSAT. So far as I can make out products from none of these are yet available. This is a quarter of a century since the systems were in place.

This is thoroughly maddening, all the more so because we all know that all the people involved will be loud in their claims of doing ultra modern marvels, whilst leisurely carrying on doing nothing very much. But I can't claim to be overly surprised. In 1998/9 that GRSG stalwart Geoff Lawrence, together with myself and partners invented a Millenium Project to fly 4 metre resolution airborne 102-channel hyperspectral cover of the entire of the UK, as a sort of Domesday spectral statement of the condition of the country at the year 2000. Against this all future changes could be checked, even over another thousand years. The RS data would be on CDs usable by anybody with a PC. You could check your allotment if you liked. Key data sets were to be placed in schools, libraries, universities, local authorities. At £8 million it was much cheaper than the Dome and plenty more useful. The Millenium Commission was very complimentary about the project, and it looked ready to go, but it was squashed by the DOE which said they saw no point in it. "We're handling it all from satellites" they said. Well, five years later we're still holding our breath.

After Thorneycroft said all those years ago "If we want a rocket, we can buy one", Space, Remote Sensing, and other miscellaneous oddments were run

by the DTI and MOD out of Q3 at Farnborough, supported in one corner by working groups for the sea, hydrology, landuse and things like that, but not geology. This irritated Steve Drury at the OU who thereupon created GAWG, the Geological Applications Working Group, of which I was first chairman. GAWG later transmogrified into GRSG. There was also, and perhaps still is, a National Remote Sensing Programme Board. I was on that too. GAWG decided that it would struggle for a real UK identity in space affairs and geological remote sensing. We didn't succeed. Westminster, Whitehall, NERC, academe, ESA, the EU, the aerospace industry were all opposed, and the public was not allowed to know anything about it, so the outcome is scarcely surprising. "We are not into status projects" said Whitehall. The tax money was to be cycled through Brussels and Frascati , which was best to keep quiet about. These were places for bandwagons.

There were several things that made sure that the interests of the public did not intrude, despite the fact that the public paid. First was the "We can't go it alone" ethos washing through Whitehall in the 1970's. This, translated, meant "No responsibility here, thanks, but I've fixed that my own job is fireproof". Britain's £110+ million per year for space affairs was to be cycled through ESA so that we could catch the bus, punch above our weight, get a level playing field etc., in such affairs. So, from the Woomera days when we successfully launched a satellite then shut the facility down, by 1981 we didn't do anything for ourselves. "You don't have a project in typewriters let alone Space" the US Embassy Science Attache of the time told me. The Indian Space Research Organisation was currently displaying it's own sounding rocket outside the Science Museum in Exhibition Road.

The great thing about shunting taxpayers' money through ESA is that it evades any de Lorean or Groundnut style threat of can-carrying whilst satisfactorily keeping the main electronics and aerospace people covertly subsidised although at over the top cost and in the main getting us nowhere. More often as not our competitors benefit more than ourselves. There are other grim features. Only the magic circle gets in on the act. At the time I'm talking about NASA had 100's of contractors. Here, after 10 years only 8 British firms had had ESA contracts. What's more, these were the same people as got any other big money as well. Like the £100 million Information Technology ALVEY project for example. "Might just as well give the money to people who I know can do the job" said the guy in Whitehall. Whether they did the job or not is open to question. Some years later I found an official who remembered ALVEY. He presumed that there must have been a report but wasn't sure. What he did recall was that the project manager had gone to Brussels to run the ESPRIT IT programme. Maybe he'd taken the report with him.

Another major obstacle is NERC. "Our brief is SCIENCE, not UK Ltd" intoned a NERC dignitary to me. NERC has been running an RS aircraft for getting on to 20 years. RS science has indeed benefited, and undoubtedly the attached administration, but the rest of us hasn't noticeably done so. That plane's AADS 1268 could have imaged the entire country a dozen times over by now but mostly it images Thetford and not much more. In the SW they don't know

it exists. To handle the vast flow of data NERC has just opened a great processing place at Lancaster University to handle information from....er, well, somewhere.

Throughout, the Government institutions and academics have been looking after themselves. Westminster and Whitehall know very well that this is what they will get up to but in the calculated absence of a Ministry of Science and Technology connive at it. In the late 70's a campaign was mounted for the creation of a British Space Agency. The idea was that this would have compelled the establishment to initiate and implement national projects alongside bilateral and international ventures. Whitehall easily deflected this ploy by creating the British National Space Centre instead, basically an ESA mouthpiece. This meant that all the same people were able to carry on as usual.

Recently the head of BNSC announced that ESA had new tranche of E40 million for such things as disaster monitoring from satellite. I don't know whether this is to stop disasters or wait for another Krakatoa or what. It's also to make sure our aid is usefully directed. Oh yes? The £500 million West Bank Outfall Drain of the Indus, an ideal project for RS monitoring, as far as this aspect went might just as well have been drawn up by Darwin. All the checking was to be done by a myriad of little fellows in flat-topped topees (*ed – topees are sun hats*). I see in the local newspaper lately that the Plymouth Marine Lab's RS unit is to make a great scientific breakthrough by studying plankton blooms in 2002 imagery of the Channel. I wonder whether they are still there. I was in that Lab 15 years ago talking about such applications. What have they been doing since? The Italians were looking at blooms hyperspectrally in the Adriatic over a decade ago.

Since I started in these affairs in 1970 some £3,400,000,000 of taxpayers money has gone into the space business. Much emphasis has been placed on Earth observation. With this amount of money invested you'd think that they should have got round to effective routine monitoring of our own environment by now.

I heard a doctor talking about the NHS the other day. He said: "The system isn't interested in the patients. It just uses them to promote the administration". The same obviously applies in what we are now looking at. And how much else as well?

Tax-payers want returns for their tax. Most people won't mind, welcome in fact, some of their tax money going to Science, to international technical collaborations, to help advance the 3rd World, but first want it bettering our own condition, to enhancing our knowledge of these technical things, to boosting our own economy, to firing the imagination of our youngsters so that they want to get involved. Have we had £3,400,000,000 worth of that? And if not, who has had it?

(ED- the views expressed are not are not necessarily the official views of the GRSG - we welcome any comments from the readership).

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PLANETARY REMOTE SENSING NEWS

Planetary remote sensing is increasing in popularity within Geology / Earth Science departments in the UK. The data is generally free and the multispectral and spatial resolution is comparable and in some cases (on a global scale) better than Earth imagery. Comparative geology between Earth and the planets / moons of our solar system is now becoming an exciting "new" research area. In reality, researchers have been comparing features on Earth to the planets ever since we were able to image the solar system with telescopes. The first major jump in image resolution of planetary features was made in the 1960's during the planning for the Moon landings. Since then all the major planetary bodies have been imaged at various resolutions involving a variety of different sensors.

This increase in planetary data and the potential research applications is now an important research theme. The UK government funding bodies, i.e. NERC and PPARC are looking into setting up a new planetary science initiative focused "on the origin and early evolution of the Earth and Earth like planets, planets as platforms for life, and planetary atmospheres." A meeting at the Geological Society on September 15th 2004 was organised to show the depth of UK research into planetary science indicating the potential opportunities for a new funding source. For more information on the Planetary Science Initiative visit the websites below:

Joint NERC-PPARC Planetary Science Initiative websites:
http://www.geolsoc.org.uk/template.cfm?name=NERCPPARCTOWNMOOT

http://www.nerc.ac.uk/funding/earthsci/planetsci.shtml

One of the largest worldwide planetary science conferences is held in Houston USA every year and is supported by NASA. This conference summarises the exciting remote sensing missions that explore our solar system. The following urls have information on this conference and research contacts in planetary science. From recent conferences Mars and Saturn are the focus for research at the moment.

Lunar and Planetary Institute
http://www.lpi.usra.edu/meetings/

Lunar and Planetary Science Conference
http://www.lpi.usra.edu/meetings/lpsc2005/

Mars

Mars is the place to be at the moment, in a planetary research sense. There is a plethora of active and passive sensors on several spaceborne platforms and the occasional lander. NASA has an excellent Mars website which

summarises the various NASA mars missions including the stunning results from the Mars Odyssey spacecraft (see GRSG newsletter issue 31).

Nasa's Mars Exploration website:
http://mars.jpl.nasa.gov/

Nasa's Mars Odyssey website:
http://mars.jpl.nasa.gov/odyssey/

Themis is the optical sensor array on Mars Odyssey (see issue 31). Exciting new high resolution images of the Martian surface are posted every day. For more information go to the following url:

The Themis website
http://themis.asu.edu/latest.html

The European Space Agency's Mars Express, as many of you will know, is a very successful orbit platform mapping the Martian surface. On-board it has a stereo optical camera arrangement, which has and is producing stunning perspective views of the Martian landscape at resolutions comparable to ASTER imagery of Earth. For more information go to the Mars Express website:

ESA's Mars Express website
http://www.esa.int/SPECIALS/Mars_Express/

Saturn

The Cassini probe or "planetary bus" (the platform is large) is currently in a mapping phase of Saturn and its moons with an armoury of active and passive sensors. Recently, many of you will have seen the amazing multispectral images of Saturn's rings, which indicate compositional variations throughout the ring system. The Cassini spacecraft has a number of science mission goals one being the imaging of Titan's atmosphere and surface. This has important research aims as expected results may have implications for the evolution of life on Earth. Imaging of Titan's atmosphere during previous missions and earth-based observations indicate complex organic compounds that could support life.

On-board Cassini is the Huygens probe, which will detach from the spacecraft and attempt a landing of the moons surface. The exciting part of this mission is that, as like Venus, we did'nt know much about the surface of Titan as it is shrouded in cloud. However, Cassini has a variety of sensors that have now penetrated the cloud and given us tantalising glimpses of the surface. Firstly infrared optical images have indicated mountainous regions. Also Cassini has an imaging radar which during a recent fly-past has shown intriguing surface landforms. Further combined interpretation optical and radar imagery of the surface will unravel the surface morphology of this moon.

The image below is a mosaic of nine optical near-infrared images showing Titan's surface topography.

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Expiry Date (Month/Year): __ __ / __ __

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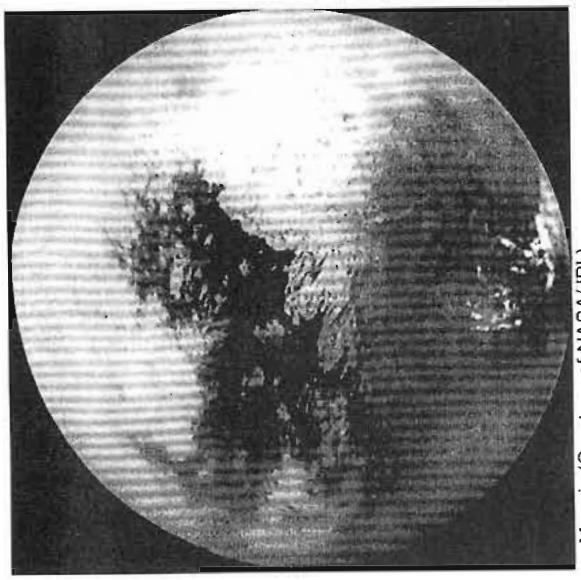
Signature: _____

We are also able to organise bank transfer payment on request (see contact details below).

UK Data Protection Act 1998: GRSG stores your membership details on computer. We do not divulge this information to any third parties without your prior consent. Please sign below to indicate your agreement to being added to our database:

Signature:_____Date:_____

Accommodation for the AGM: *To keep administrative costs and registration fees low*



NIR Image Mosaic (Courtesy of NASA/JPL)

NIR image of Titan's equatorial region (Courtesy of NASA/JPL)

Annual General Meeting 2004 and Membership Form 2005

Personal Details:

Title: _____ *First Name:* _____ *Last Name:* _____

Position: _____

Division/Department: _____

Company/Organisation: _____

Address: _____

_____ *City:* _____

Postcode: _____ *Country:* _____ *Tel:* _____

Email: _____ *Fax:* _____

GRSG Annual General Meeting 2004, Monday +Tuesday December 13th/14th:

Individual Member:	*UK £40*	*USA/€ $80*	*CAN $100*	*AUS $120*	_____
Individual Non Member:	*UK £60*	*USA/€ $120*	*CAN $150*	*AUS $170*	_____
Student Member:	*UK £20*	*USA/€ $40*	*CAN $60*	*AUS $70*	_____
Corporate Sponsor:	*UK £300*	*USA/€ $600*	*CAN $750*	*AUS $900*	_____

(Corporate Sponsors receive up to ten 2004 AGM registrations, ten individual 2005 GRSG memberships, and Current News column in the GRSG Newsletter.)

Single Day attendance, Monday or Tuesday December 13th or 14th:

Individual Member:	*UK £25*	*USA/€ $50*	*CAN $65*	*AUS $80*	_____
Individual Non Member:	*UK £35*	*USA/€ $110*	*CAN $140*	*AUS $160*	_____
Student Member:	*UK £10*	*USA/€ $40*	*CAN $60*	*AUS $70*	_____

MONDAY 13th ☐ *TUESDAY 14th* ☐ *(Please specify which day you will attend)*

[1] AGM Total* _____

[1] Please return AGM form by 30th November 2004. Late payment or registration on the day will incur the following administration charges per day:*

Individual Member:	*UK £10*
Individual Non Member:	*UK £15*
Student Member:	*UK £10*

GRSG Membership 2005: Deadline for membership payment is January 31st 2005

Individual:	*UK £14*	*USA/€ $28*	*CAN $35*	*AUS $40*	_____
Student:	*UK £7*	*USA/€ $14*	*CAN $21*	*AUS $25*	_____
*[2]*Corporate A:*	*UK £100*	*USA/€ $200*	*CAN $250*	*AUS $300*	_____
*[2]*Corporate B:*	*UK £200*	*USA/€ $400*	*CAN $500*	*AUS $600*	_____

([2] Corporate A membership includes up to seven individual 2005 GRSG memberships. Corporate B membership includes eight or more individual 2005 GRSG memberships. Corporate members will also have their logo and contact details printed in the newsletter)*

Payment information on next sheet:

Membership Total _____

TOTAL CHARGES _____

hotel reservations should be organised directly by attendees. The website http://www.londontown.com is recommended for searching best rates and availability.

PLEASE RETURN THIS FORM TO:

Claire Fleming, GRSG Treasurer
British Geological Survey, Kingsley Dunham Centre
Keyworth, Nottingham, NG12 5GG, United Kingdom

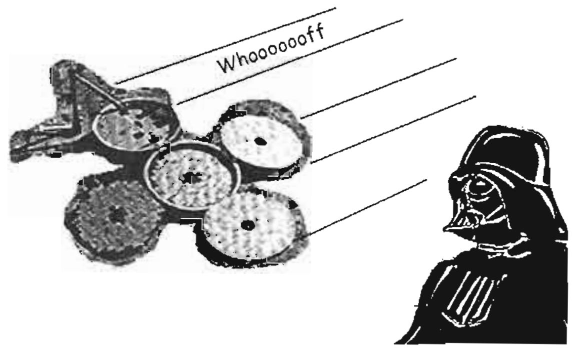
Fax: +44 (0)115 936 3474
Tel: +44 (0)115 936 3225
Email: ccot@bgs.ac.uk

The above image is a NIR image of the equatorial region showing a streaked patterned surface indicating possible fluvial / wind processes. Recent radar images (see below) showing differences in surface roughness indicate a dynamic landscape with possible wind erosion and fluvial like fan deposits.

Radar image (Courtesy of NASA/JPL)

The preliminary imaging of Titan using Cassini's formidable array of sensors including the near-infrared optical imagery and radar, indicate active geomorphological processes suggesting recent geological processes. With increased spatial resolution images and the launch of the Huygens lander, the geomorphological and geological history of Titan's surface will unfold. For more information on the Cassini-Huygens mission and on the above images visit the following urls:

http://saturn.jpl.nasa.gov/home/index.cfm
http://saturn.jpl.nasa.gov/news/events/titana/index.cfm



"Asteroids do not concern me, but whats that crashing into my Star Destroyer"

WEB MATTERS

Message from the webmaster:

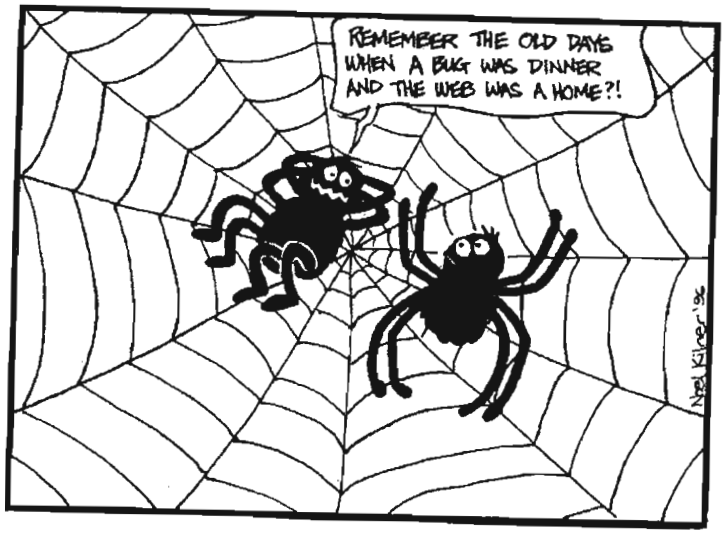
GRSG newsgroup needs YOU.

Tired of being the last one to hear the latest geological remote sensing news? Want to share your latest findings? Have a question that only a GRSG member could answer?

If the answer to any of these questions is yes, then it sounds like the GRSG newsgroup is for you!

This e-mail discussion forum aims to be a rapid forum for discussing and disseminating geological remote sensing news and information. To reach critical mass, it needs YOU to join.

To sign up, follow the Newsgroup link on http://www.grsg.org, or send an e-mail to grsg-subscribe@yahoogroups.com



MEETINGS

"The Impact of Satellite Techniques on the Observation and Modelling of Continental Deformation"

(Two-Day RAS/BGA Meeting, Feb 10-11)
Day 1: Linnean Society Lecture Theatre, Burlington House
Day 2: Geological Society Lecture Theatre, Burlington House

Organizers: Profs Barry Parsons (Oxford; barry.parsons@earth.ox.ac.uk), James Jackson (Cambridge), Paul Cross (UCL)
Website: http://comet.nerc.ac.uk/news_rasmeeting.html

Satellite measurements now enable crustal deformation to be determined globally on a wide range of spatial and time scales. InSAR and GPS measurements provide the means to map globally crustal strain accummulation, to probe the mechanical properties of the crustal and uppermost mantle, and to reveal aseismic slip events that could be precursors to large earthquakes. High-resolution digital topography constructed from satellite measurements, together with GPS and InSAR studies of the earthquake cycle, allow the long-term growth of geological structures to be understood in terms of the cumulative effects of many earthquakes. The meeting aims to explore recent advances due to such measurements and their impact on our understanding of continental deformation.
(N.B. This meeting runs over two days: Thursday and Friday.)

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The Remote Sensing and Photogrammetry Society

Annual Conference - First Call for papers

RSPSoc2005 - Measuring, Mapping and Managing a Hazardous World

University of Portsmouth 6 - 9 September 2005

RSPSoc2005 will cover the use of photogrammetry and remote sensing in measuring, mapping and managing the wide range of hazardous features that we face today. It will be held in the conference facilities at the University of

Portsmouth, with all grades of residential accommodation close by. The conference will include the Society's AGM, the Taylor & Francis reception and the Society Awards ceremony. There will be an opening reception at Southsea Castle and the Conference Dinner will be held on board HMS Warrior, a 19th century 'iron-clad' battleship.

Sessions will be led by keynote speakers and there will be plenty of opportunity for the presentation of papers, both orally and as posters. A list of possible topics is given below – this is by no means definitive: all presentations that meet the conference theme will be considered. As this is the Society's annual conference there will also be sessions for which papers on any aspect of photogrammetry or remote sensing will be welcome.

- *Global scale issues:* climate change, ozone 'holes', meteorology, oceanography, carbon sequestration, deforestation, desertification, urbanisation, international cooperation

- *Specific hazards:* coastal zone, rivers and floods, soil erosion and land degradation, landslides, subsidence, volcanoes, earthquakes, wildfires, crop diseases, air and water pollution, contaminated land, accelerated weathering of monuments

- *Mapping & managing: civil* emergency planning, hazard mapping, risk assessment, conflict prevention, mapping minefields, disaster preparedness, disaster relief, insurance industry links

- *New technologies and their utilisation*: satellite; airborne (eg, LiDAR, hyperspectral); ground-based (eg, LiDAR, InSAR); data fusion and GIS applications.

If you wish to make a presentation, either orally or as a poster, please email a 400-word Abstract to the Conference Convenor: richard.teeuw@port.ac.uk The abstract should cover the main points of the paper, including a summary of key research findings. Papers that specifically address the conference theme are encouraged and will be given preference.

The deadlines to be noted are:

Deadline for the submission of abstracts:	***Friday 11th March 2005***
Notification of acceptance of papers:	***Friday 29th April 2005***
Deadline for submission of full papers:	***Friday 24th June 2005***

If you would like to register your interest for the Annual Conference, so that we can keep you informed, please let us know by sending an email to RSPSoc Office: rspsoc@nottingham.ac.uk

MEETING REPORTS

RSPsoc2004 – report on the Geological Remote Sensing Group sessions

"Earth resources: exploration, exploitation and environmental impacts"

Richard Teeuw, GRSG Chairman
Richard.Teeuw@port.ac.uk

The GRSG sessions were opened by Marc Goossens (Geosense, the Netherlands) with an extended presentation on ASTER applications in mineral exploration. This masterclass covered many aspects of ASTER's versatile sensor capability: notably which spectral bands to use for which minerals, aspects of the image processing and uses of the DEM component in mineral exploration. Case studies were given of ASTER applications in exploration for epithermal gold, porphyry copper, Fe-oxide copper-gold and skarn deposits. Next on was Alan Williams of NPA Group. Alan gave some fascinating insights into the use of satellite remote sensing (Landsat TM, SPOT, ASTER, IKONOS, Quickbird and ERS SAR) in petroleum exploration. Case studies were given from Pakistan, using ERS SAR for offshore basin screening of oil seeps and multi-sensor mapping of oil basins on the Pakistan-Afghanistan border (where mapping has become much more reliant on remote sensing in recent years!).

The second session focused on the impacts of mining and petroleum extraction, started with Claire Flemming et al. (British Geological Survey) examining the role of remote sensing in geo-environmental modelling (GEM). Claire spoke about remote sensing contributions to the E.U. MINEO project, aimed at the restoration of mine waste sites across Europe. A key aspect of MINEO is geo-environmental modelling, using GIS to integrate mining data, geochemical/geotechnical data and remotely sensed imagery. Of particular interest when mapping areas of mine waste are zones of carbonates (which act as buffers to acid waters) and clays (which generally do not act as buffers and whose impermeability enhances surface runoff). To aid the hyperspectral detection and mapping of these zones MINEO has developed a mine waste spectral library. A case study was given of recent BGS research using remote sensing to map pollution associated with mining in Cyprus.

Graham Ferrier (University of Hull) spoke on mapping acid-generating minerals at the Rodalquilar gold mine in the Cabo de Gata Tertiary volcanic region of SE Spain. Field spectrometry: up to 80mg/kg of cyanide was found in the stream sediments draining the eroded tailings dam (nb. ingestion of 50mg/kg of cyanide can be fatal!). Correlation (0.9) found between the concentration of haematite/goethite and cyanide concentration, making proxy mapping of cyanide possible, via hyperspectral remote sensing. Finally, Tod

Rubin, speaking on behalf of Evans et al. (ChevronSasol) described the use of HYPERION (220 bands, 30m resolution, 7km swath) and ALI (30m pixels, 10 bands, 40 km x 40 km scene) for petroleum exploration and development in the Caspian Sea region. This approach detected oil seepages on the ground, allowed the production of land cover and basic habitat maps, and used a GIS to guide the location of new petroleum facilities.

Many thanks to the speakers for a very interesting set of presentations, highlighting the growing use of remote sensing in the earth resources and environmental management sectors.

SELECTED MEETING ABSTRACTS

The following selected abstracts are from the RSPSoc 2004 Aberdeen conference, reported by Richard above. For full paper publications please contact the RSPSoc.

ASTER: a major advance in mineral exploration

Marc Goossens

Geosense, The Netherlands
Contact: geosense@wxs.nl

ASTER (Advanced Spaceborne Thermal Emission and Reflection Radiometer) is an imaging instrument that is flying on Terra, a satellite launched in December 1999 as part of NASA's Earth Observing System (EOS). ASTER is used to obtain detailed maps of land surface temperature, emissivity, reflectance and elevation.

Its high spectral resolution (3 bands in the VNIR, 6 bands in the SWIR and 5 bands in the TIR), combined with its good spatial resolution (15m for the VNIR, 30m for the SWIR and 90m for the TIR, see table below) makes it a very promising tool for the mineral exploration industry. The fact that the data are available at such low cost (US$50/scene) increases the attractiveness of using Aster data.

VNIR	SWIR	TIR
Band 1: 0.52 -0.60 µm (nadir looking)	Band 4: 1.600 - 1.700 µm	Band 10: 8.125 - 8.475 µm
Band 2: 0.63 - 0.69 µm (nadir looking)	Band 5: 2.145 - 2.185 µm	Band 11: 8.475 - 8.825 µm
Band 3: 0.76 - 0.86 µm (nadir looking)	Band 6: 2.185 - 2.225 µm	Band 12: 8.925 - 9.275 µm
Band 3: 0.76 - 0.86 µm Backward looking)	Band 7: 2.235 - 2.285 µm	Band 13: 10.25 - 10.95 µm
	Band 8: 2.295 - 2.365 µm	Band 14: 10.95 - 11.65 µm
	Band 9: 2.360 - 2.430 µm	
Ground resolution: 15m	Ground resolution: 30m	Ground resolution: 90m

The mineral exploration industry is now increasingly profiting from the new possibilities offered by Aster. Much experimenting is taking place in order to find out how much we can get out of the data and in what way.

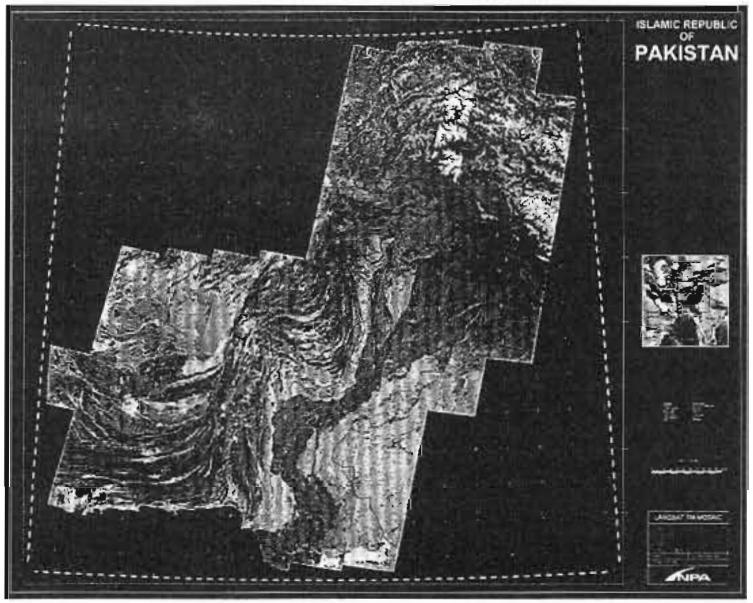
I have had the opportunity to perform extensive analysis, including field checking, in various parts of the world, in various geologic settings, and for different styles of mineralisation, and it is very obvious that Aster means a major step forward when compared to what was possible with Landsat.

In this presentation the great value of Aster imagery as a tool in mineral exploration will be demonstrated, not only for target generation but also for providing basic topographic information in remote and poorly documented areas.

Examples will be shown from a variety of targets such as epithermal gold, porphyry copper, Fe-oxide copper-gold, Bauxites and contact metamorphic skarns, located in different parts of the world, such as South America, Central Asia, Iran and Australia.

The role of satellite data in exploration for new petroleum reserves; a Pakistan case history

Alan Williams, Oil & Gas Manager, NPA Group, Crockham Park, Kent UK



Despite successful cost-cutting initiatives and reduction in finding costs per barrel, the costs of exploring the world's remaining frontier basins continue to rise as the industry moves offshore into increasingly deeper waters and onshore into increasingly hostile environments. Geological data obtained

from some 800 kilometers above the earth could help ease the pain. Satellite remote sensing, after some 30 years of patient development, has now reached maturity as a respectable technology and can offer the industry an effective, low-cost, high coverage service which is adaptable to any exploration environment and has particular relevance to this region, both on & offshore. The paper will focus on Pakistan but the techniques are applicable in any country in the world where a good range of optical and SAR data are available

Since 1992, a powerful technology for reducing risk in offshore basins, satellite oil seep detection, has emerged. This is active micro-wave radar or SAR (Synthetic Aperture Radar), which now offers the industry wide-swath, multiple-repeat imagery over all the world's continental margins in all water-depths including the new ultra-deep frontier basins (>3000 metres WD). This technique has been successfully used in the exploration of Pakistan's new deep-water offshore frontier, the Indus Basin, from which results will be shown. These will be contrasted to results from another deep-water hot-spot, the South Caspian Basin and the prolific seepage observed in this basin contrasted to that observed from the shallow-water North Caspian basin, which includes the super-giant Kashagan oil discovery.

Onshore, satellite imagery is now available at increasingly higher resolutions such as the one metre Ikonos data and 60cm Quickbird Imagery, which provides the industry with comparable resolution data to aerial photography. The 14-band ASTER hyperspectral satellite has opened up new avenues for detailed onshore prospect mapping and seep detection plus other applications such as seismic planning. This imagery can be integrated with 2D or 3D seismic in the high-speed comfort of one's desktop to produce stunning 3D perspective views combining surface imagery and subsurface geology in a single image, as will be shown from the neighbouring Zagros Fold -belt of Iran.

This presentation contrasts the relative ease of interpreting imagery from the Kirthar Fold and Thrust belt with the more challenging job in the featureless Indus Plain where more subtle approaches are required. Examples from a range of satellite data will be compared and contrasted to show how information from satellites can help the oil and gas industry in Pakistan cut the cost of finding those elusive elephants.

The role of remote sensing in geo-environmental management

Bateson, Fleming, Klinck, Marsh, Naden and Palumbo

British Geological Survey, Keyworth, Nottingham
Contact: shm@bgs.ac.uk

Mitigating the impact of mining activity is a significant challenge for environmental management. The World Summit on Sustainable Development (Johannesburg, 2002), European directives on soils and water and related British legislation demand improvements in this process. New approaches are required based on both environmental information from in-situ, airborne and satellite observations and on sound science. Hyperspectral remote sensing and geo-environmental mineral deposit modelling (GEM) are two such approaches being pursued at the BGS. The first step is to use remote sensing data to characterise mine waste and its host rocks and then to monitor its disperal in the environment. New hyperspectral remote sensing techniques developed to do this within the EC FP5 Project MINEO, and now applied in a range of BGS projects across the UK, will be described. The second step is to model the mineral deposit and its environmental impact. In principle, all mineral deposits can be characterised on the basis of their geologic, geophysical, geochemical characteristics and processes, giving us the mineral deposit model. The BGS have extended this concept to assess, predict and evaluate their environmental impact - the GEM approach. Three key, model elements can be provided using remote sensing data; carbonates that buffer acids; clays, that do not; and a surface model. A site in Cyprus will be described, parts of which have been heavily mined and parts of which give us an unexploited baseline. The study aims to deliver models that improve our understanding of natural and anthropogenic pollution associated with both the mineral deposits themselves and with their exploitation. Remote sensing data acquired over Cyprus in Spring of 2004 will be presented and their use to populate the initial model will be described. The two studies will be used to set out the future role for airborne and ultimately space-based remote sensing in geo-environmental management.

Petroleum industry applications of HYPERION and ALI data

Marty Evans and Laura Hall, ChevronTexaco; Nurgul Amanova and Bradford Dean, Tengizchevroil; James Ellis[1], Ellis GeoSpatial; Hattie Davis, Artistic Earth; Robert Turner, Boeing and Tod Rubin, SasolChevron

Contact: Trubin@SasolChevron.com

Hyperion and ALI sensors were tasked in late Spring and Summer 2002 over Tengizchevroil acreage in Central Asia. The experimental hyperspectral and multispectral data were ordered to support environmental baseline and change-detection mapping. Seven overlapping Hyperion strips and two ALI images were needed to cover the area. To increase the number of potential acquisitions during the limited time frame, the satellite was rolled east-west

during orbit to enable off-nadir imaging. This maneuvering increased the number of attempts per month from the standard ~2 to ~8-10. Over 20 acceptable Hyperion and ALI images were successfully acquired. Georeferencing both nadir and off-nadir Hyperion and ALI imagery to a GPS-controlled Landsat TM base image revealed little difference in accuracy. In addition, we detected no visual degradation in imagery or maps that were derived from off-nadir data.

We have found advantages mapping the Hyperion data in 1) radiance, 2) apparent reflectance (using ACORN and parameters recommended by CSIRO/NASA), and 3) apparent reflectance *after* using CSIRO's ENVI Destreaking program. Spectral signatures have excessive variability and are associated with visually degrading spikes of random (?) bad bands that make visual correlation very difficult for most materials. Developing a visually consistent spectral library will require additional knowledge about converting from radiance to reflectance from the research community. Noise, vertical striping, and random bad bands frustrate attempts to use automated processing procedures with Hyperion. ~155 wavelength bands are available for mapping and developing spectral signatures of features of interest.

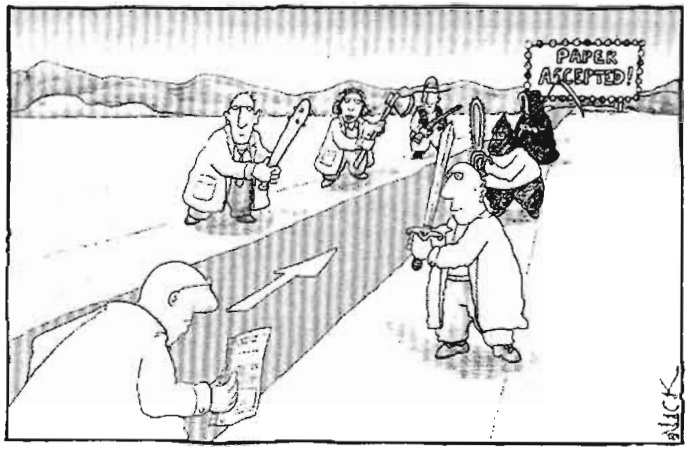
For our environmental mapping, Hyperion datacubes are best and most reliably exploited when they are constrained to select features and a geographically limited area. The mixing of materials of interest within Hyperion's 30-meter pixels, the unknown effects of the atmosphere, and the experimental nature of the satellite sensor require a different and more flexible approach to preprocessing and processing. ALI spectral profiles are stable and consistent within a scene and scene-to-scene. However, the longer wavelength SWIR bands (8 and 9) appear to have reduced dynamic range compared with bands 1-7. This drop-off impacts our mapping strategy.

A pilot project has been completed that demonstrates Hyperion and ALI data can be effectively used together to map regional environmental conditions and support change detection. Well-described and accurately located training sites are essential for successful mapping.

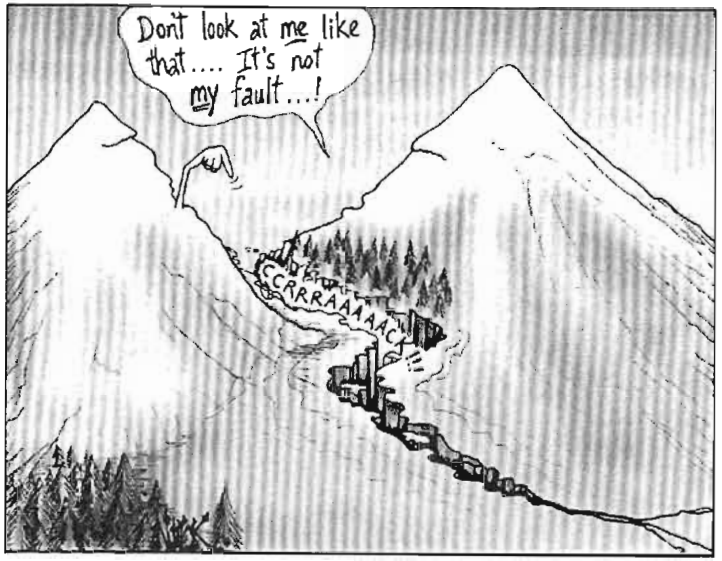
Mapping acid-generating minerals using imaging spectroscopy

G. Ferrier, University of Hull, Hull, HU6 7RX, UK
Email : g.ferrier@hull.ac.uk

The monitoring of the environmental impact of abandoned mines and rehabilitated post-mining areas is of immediate importance as both long term contamination of large areas or even catastrophic failures, such as the Aznalcallar mine in Spain, can occur with disastrous environmental and health



Most scientists regarded the new streamlined peer-review process as 'quite an improvement.'



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The GRSG does not purport to have a unified view and this newsletter is a forum for the views of all its members and their colleagues in industry, colleges and government on a free and equable basis.

"Send me that article or else....."

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