

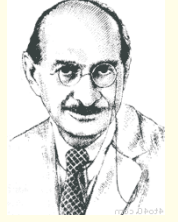


Vol. 2017/6



Drishtikon

*A half yearly newsletter of research scholars of
Wadia Institute of Himalayan Geology, Dehradun.*



- IN FOCUS
- EXPRESSIONS
- NEWCOMERS
- ACHIEVEMENTS
AND AWARDS
- ILLUMINATING
ARTICLES
- SCIENCE UPDATED
- FIELD
PHOTOGRAPHS

सम्पादकीय

शोध छात्रों का छमाही पत्रक 'दृष्टिकोण' का नया अंक पुनः आपके सामने है। छात्रों की बौद्धिकता के विविध आयामों के अवलोकनार्थ एवं सतत उन्नयन के लक्ष्य पर, यह पत्रक क्रमशः आगे बढ़ रहा है। इस बार फोकस में विज्ञान एवम् वैज्ञानिक अवधारणाओं के विकास क्रम में विभिन्न मानदण्डों की स्थापना की प्रक्रिया को अपने दृष्टिकोण से रखने का प्रयास विपिन ने किया है।

वर्तमान में प्रौद्योगिकी का विस्तार जीवन के हर क्षेत्र में देखा जा सकता है। नवीन तकनीकी प्रगति से नित्य ही हम दो-चार होते रहते हैं। यह प्रगति इतनी तेजी से हो रही है कि इसके साथ समायोजन में जीवन की भाग-दौड़ भी बढ़ गई है। प्रगति की यह दौड़ अंधा-धुंध है। परिणाम स्वरूप इससे होने वाली हानि भी विकराल हो रही है। वैश्विक स्तर पर तापमान में वृद्धि, जलवायु परिवर्तन, विभिन्न प्रकार के प्रदूषण इस धरती पर जीवन के अस्तित्व को ही चुनौती दे रहे हैं। कई प्रजातियाँ लुप्त हो गयी हैं, कई भाषायें अस्तित्व खो चुकी हैं और कई लुप्त होने के कगार पर हैं। क्या प्रौद्योगिकी की दौड़ मनुष्य पर हावी नहीं हो रही है? क्या ऐसा नहीं लगता कि किसी भी नवीन तकनीकी/प्रौद्योगिकी को अपनाने से पहले या उसकी स्वीकृति के लिये, उसके वातावरण में, जनजीवन पर पड़ने वाले प्रभावों की व्यापक समीक्षा होनी चाहिये। क्या उन्नत प्रौद्योगिकी के सहारे दिखने वाली मानवीय प्रगति समावेशी है? कुछ इन्ही दायरों से निकलते हुए पंकज और सत्यव्रतदास के आलेख इस बार दृष्टिकोण में समाहित है।

अभिव्यक्तियों में, समीप में बिजली गिरने से उत्पन्न बौखलाहट को तनु ने अपने शब्दों में बाँधा है वहीं अतुल की भू-विज्ञान एवम् उसके महत्व पर लिखी गयी कविता निश्चित ही उत्कृष्ट शब्द व्यंजना का उदाहरण है। इस अंक से कुछ नये प्रायोगिक स्तम्भ "साइंस अपडेटड" व "नेचर क्लिक" की शुरुआत इस विश्वास के साथ हो रही है कि शायद ये स्तम्भ पाठकों में रुचि को बढ़ा सकें और छात्रों से इस पत्रक के लिये योगदान बढ़ सके। अन्त में अरुण द्वारा सेमिनारों में पोस्टर प्रदर्शन के नये रूप के बढ़ते हुए प्रयोग की जानकारी के साथ आपकी टिप्पणियों के लिये दृष्टिकोण टीम सदैव की तरह प्रतीक्षारत्न है।

*We want to hear
from you..*

*To inspire our readers
and to flaunt your
accomplishments, we
would like to feature
your articles/updates in
the upcoming volume of
our newsletter.
Please address your
articles to-
drishtikon@wihg.res.in*

*Feel free to send us your
feedback.*



IN FOCUS

Paradigm of Science

Scientific ideas change fast. Compared with any other intellectual endeavour such as philosophy and art, science is a rapidly changing activity. From Aryabhata's astronomical account to Einstein's relativity theory, science has diversified and broadened exponentially. However, scientific revolutions happen relatively infrequently most of the time and so, science can be perceived as normal vs. revolutionary science.

Normal science is something in which scientists engage in when their discipline is not undergoing revolutionary change. It aims to develop and extend the existing paradigm without examining the roots of existing paradigm. For example, if a scientist gets an experimental result that conflicts with the paradigm, he/she will usually assume that his/her technique is faulty, and not that the paradigm is wrong. This practice makes the science conservative. But over time, anomalies are discovered; phenomena that simply cannot be reconciled with existing theories. When anomalies are few, these are ignored but as more and more anomalies accumulate, confidence in existing paradigm breaks down. This marks the beginning of revolutionary science. A variety of alternatives to the old paradigm are proposed, and eventually a new paradigm becomes established. The essence of a scientific revolution is thus, the shift from an old paradigm to a new one.

-Vipin Kumar (SRF)

EXPRESSIONS

भूविज्ञानी

सहृदय पुलकित होकर,
प्रस्तुत है ये अकथ कहानी।
वसुंधरा है मेरी प्रयोगशाला,
मैं भूविज्ञानी मैं भूविज्ञानी।।

सूक्ष्म कणों के संयोजन से,
इस पृथ्वी का सृजन हुआ।
जैव सृजन के प्रक्रम से,
जीवन का आगमन हुआ।।
एक कोशिकी जीवों से ही
उपजा है हर प्राणी।
वसुंधरा है मेरी प्रयोगशाला,
मैं भूविज्ञानी मैं भूविज्ञानी।।

नील हरित शैवालों से,
ऑक्सीजन का संचार हुआ।
ज्वालामुखीय विस्फोटन से,
परिमंडल का विस्तार हुआ।।
ज्वालामुखीय विस्फोटन से ही,
बना है ये अविरल पानी।
वसुंधरा है मेरी प्रयोगशाला,
मैं भूविज्ञानी मैं भूविज्ञानी।।

भूपरतों के टक्कर से,
निर्मित हुआ हिमालय है।
तृतीय ध्रुव बना हुआ
वृहत बर्फ का संचय है।।
माउन्ट एवरेस्ट श्रृंग बनी,
वैश्विक उच्चता की निशानी।
वसुंधरा है मेरी प्रयोगशाला,
मैं भूविज्ञानी मैं भूविज्ञानी।।

सागर है अपनी अंकों में,
अमूल्य सम्पदा भरे हुये।
भूमंडल की सर्वाधिक
जैवविविधता लिए हुये।।
ऊर्जा चक्रण में वारिधि की,
महत्ता हम सबने जानी।
वसुंधरा है मेरी प्रयोगशाला,
मैं भूविज्ञानी मैं भूविज्ञानी।।

हीरे, पन्ना, माणिक्य, स्वर्ण,
सब पृथ्वी माँ के औचल में।
बहुमूल्य सम्पदा भरी हुई,
सब देखकर है कौतूहल में।।
काला सोना है बहुत खास,
जिसने है बदली जिंदगानी।
वसुंधरा है मेरी प्रयोगशाला,
मैं भूविज्ञानी मैं भूविज्ञानी।।

भूकंप, बाढ़, भूस्खलन भी,
इस धरती के परिचायक है।
वसुंधरा से न करे खिलवाड़ कभी,
नर केवल आश्रय के लायक है।।
प्रकृति लेगी विकराल रूप,
तो प्रचंड त्रासदी है आनी।
वसुंधरा है मेरी प्रयोगशाला,
मैं भूविज्ञानी मैं भूविज्ञानी।।

प्रातः से लेकर रात्रि तक,
वस्तुएं प्रयोग में जो लाते हो।
मंजन से लेकर शय्या तक,
सब पृथ्वी से ही पाते हो।।
कंकर पत्थर की भाषा कहने वालो,
ये बात है तुमको समझानी।
वसुंधरा है मेरी प्रयोगशाला,
मैं भूविज्ञानी मैं भूविज्ञानी।।

वाडिया संस्थान का स्थापन,
हिमालयी शोध के लिए हुआ।
अल्पकाल में ही इसने,
अन्वेषण का शिखर छुआ।।
वाडिया संस्थान की पताका,
संपूर्ण विश्व में है फहरानी।
वसुंधरा है मेरी प्रयोगशाला,
मैं भूविज्ञानी मैं भूविज्ञानी।।

-Atul Kumar (JRF)

On a Thursday...

The biscuit slid smoothly down the side of the glass into the abyssal depths of piping hot tea. I considered going down after it, resting my forefinger on the precipitous walls of the glass for a second or two. A moment later I pulled back my appendage realising that that piece of crunchy goodness was probably a lost cause and what made that biscuit biscuit had probably departed from it by now, and that it would be pointless to sacrifice my fingers for one that had been. But, who could have predicted that incinerating my fingers would be the least of my worries that fateful morning.

All in all, it wasn't what one would call an encouraging start to the day. Certainly not with how the clouds hung low and dark, thundering, threatening and slashing every few seconds with hot, angry streaks of silvery light. But the adult world beckoned ever so persistently. A girl, or I daresay, a woman has to earn a living, and that involves stepping outside her home from time to time. I stepped out of the elevator and onto the saddle of my steed with minimal grace and pedalled onwards into the winding alleyways of Doon.

The one-eyed mongrel regarded me suspiciously with his sole visual aid and, having met his mysterious criteria, he let me pass onto the next street where I met with a rather charismatic pair of cows out on their routine morning stroll. A cool wind was bearing down steadily now and I soon learnt the reason behind their charisma that unholy morning. Nonetheless, I was glad for the wind after I passed the bovine pair for on that apocalyptic morning I had let my tresses be. On the next street, a black cat thought it safest to cross the road in front of me. Cool wind, hair flowing, cows happy, one-eyed dog still holding onto his last eye firmly, black cat crossing the road safely, I judged incorrectly that the day was slowly trying to make amends for its rather ominous start. My optimism was my folly. The glass was not half full.

I now stared down at the last leg of the journey, the final stretch of road which was lined by transformers (not *that* kind). Changing to an easier gear to tackle the incline I urged my steed forward cautiously and glanced up at the sky, where its roiling and rumbling had continued unabated. Everything was still, except me on my bike making my way slowly uphill. Then, I saw it before I heard it (duh). A flash of silver reached down for the transformer not fifty feet from where I stood with my hair flowing. The loudest bang I have ever heard in my quarter century of time on this planet reached my ears not long after. Then there was smoke. And a few thoughtful seconds later a few people peeked their heads out of their establishments. I steadied my mind and my steed and reasoned that lightning never strikes the same place twice. Right? Or was that a myth? Google. No, cycling and googling is a crime. Thinking these unhelpful thoughts I drew closer to the spot. Nobody and nothing were on fire. I passed that spot and before I could properly heave a sigh of relief, I felt a hot, stinging, pointed, piercing, ELECTRIFYING pain just above my left ear at the place with no hair. My brain immediately started to sift through all the literature pertaining to 'what to do in the event of being struck by lightning'.....one point of entry and one point of exit...static making it a hair raising experience...crouch down low and pretend to be a stork or any bird famous for one legged activities.....I had been prudent enough to read about it and now, in this situation of utmost panic, pain and shock, my brain was backing me up. I, quite frankly,

in some quiet corner of my mind, was proud of my brain. My body, on the other hand, had a mind of its own. It was reacting in the worst way possible. My legs were pedalling wildly, my left hand was up against the site of murder above my ear, my right hand was attempting to steer the bike and was failing spectacularly at it. The result was that I was that mad woman on the bicycle that day who was shaking her head wildly with one hand behind her head while crossing a road notorious for treacherous traffic. A fairly amusing sight for a casual observer.

When I finally stopped my performance, I found that since life didn't flash before my eyes as it is wont to do on such occasions, I probably wasn't dying. And the 'lightning that was above my ear' wasn't quite lightning but an insect of some form with a mighty, horrendous sting. Its identity as of today is still unknown. Whatever its nature of being, I can't help but commend it for its timing.

-Tanupriya Rastogi (JRF)

Facing the Dark Side of the Tech World

Once when I was a child I saw a computer for the first time. It was an amazing piece of instrument. After a while mobile phones came into the picture. Then smart phones, which itself is a phone as well as a computer. Our generation has been blessed with all these gifts. But the gift comes with a price. The generation is so absorbed into this virtual world that sometimes we forget to see the beautiful things that surround us. All of a sudden this generation has been brainwashed by these gadgets. We have become too dependent on these things and still we are not able to realize the intensity of this problem.

While strolling and pondering on a street an idea came into my mind about being primitive. What if there is a place with no modern technology, a place that is clean, green and undisturbed. And if there is no such place, we can build one. No phone or vehicle should be allowed here. Even roads should not be blacktopped. Food should be cooked with timber and served on pots and leaves. A place so humble that it looks like a place in the past.

People could come and live here may be for a month to cleanse the mind. It would be like living without the blessings of technology but with the blessings of nature. They should be taught about ancient ethics in this place. Living in this place might teach people about themselves and realize who they really are by listening to their inner voice.

Modern society and lifestyle is so advanced which indicates that we are intellectually evolving into a superior form. However, the products of our intelligence are polluting the earth as well as the human mind itself. Under the process of technological revolution we are progressively losing ourselves since our mind has been clouded and is confused.

As a remedy, if we can be made to think like our ancestors, like those about a thousand years ago, we could learn a lot about ourselves. Even though humanity is still inside us, we are constantly being perplexed by the fog. Sometimes the fog itself is our own fruit like, for example, technology. At times we need to be exiled into the silence to make sure that our species will not be annihilated by ourselves in the future.

-Pankaj Sharma (JRF)

I Don't Know!!!

I don't know why I got scared to see the moon! When my mom fed me a moonlight dinner, maybe I thought the moon could grab and eat mine!!!

I don't know about the Solar system! During my school days, I had many questions with me viz., how or why the planets revolve around the sun and if the earth is an oblate-spheroid how come we are standing on a flat basement despite of the oblate-spheroid earth. Though, I had these silly questions, I believed in my teachers!!!

I don't know about the critical taper model of the Himalaya! When my father was tapering the wooden piece for his furniture model!!!

I don't know about denudation! When my grandpa explained that the elevation of the hills is reduced by the act of erosion by rain and wind!!!

I don't know if "the present is the key to the past"! When I heard a Tamil proverb which states the fact that "every child represents their parents"!!!

I don't know the magnetic susceptibility! While I was playing with sand and a magnet on a piece of paper!!!

I don't know about porosity and permeability! When I read the following poem in Thirukural written by the goddess poet Thiruvalluvar explaining about the same!!!

*"In sandy soil, when deep you delve, you reach the springs
below;*

The more you learn, the free streams of wisdom flow"

At last, I did not know that my destiny was to become a Geologist! When I was playing with clay in my childhood!!!

It's all God's grace that I am getting something from everything.

-Dhamodharan Sacrates (JRF)

NEWCOMERS

<u>Name</u>	<u>Associated with</u>
1. Mr. Sanjay Kumar Verma (Project JRF)	Dr. Naresh Kumar
2. Ms. Vaishali Shukla (Project JRF)	Dr. Naresh Kumar
3. Mr. Somak Hajra (Project JRF)	Dr. Devajit Hazarika
4. Ms. Meena Bankwal (Project Fellow)	Dr. Devajit Hazarika

ACHIEVEMENTS AND AWARDS

Research papers published/In press/Accepted in SCI journals

Kumar, A., **Gokhale, A. A.**, **Shukla, T.**, and Dobhal, D. P. 2016. Hydroclimatic influence on particle size distribution of suspended sediments evacuated from debris-covered Chorabari Glacier, upper Mandakini catchment, central Himalaya. *Geomorphology*, 265, 45-67.

Krishnakanta Singh, **S. Khogankumar**, L. Romendro Singh, R.K. Bikramaditya Singh, Ch. Mangi Khuman, S.S. Thakur (2016). Evidence of Mid-ocean ridge and shallow subduction forearc

magmatism in the Nagaland-Manipur ophiolites, northeast India: constraints from mineralogy and geochemistry of gabbros and associated mafic dykes. *Chemie der Erde- Geochemistry*, Volume 76, Issue 4, Pages 605-620.

Prasath, R.A., Paul, A., Singh, S., (2017), Upper Crustal Stress and Seismotectonics of the Garhwal Himalaya using Small-to-Moderate earthquakes: Implications to the local structures and free fluids, *Journal of Asian Earth Sciences*, 135C, pp.198-211.

Biswas, **A.**, **Parija, M.**, and Kumar, S., (2017). Global nonlinear optimization for the interpretation of source parameters from total gradient of gravity and magnetic anomalies caused by thin dyke, *Annals of Geophysics* (In Press).

Hazarika, D., **Paul, A.**, **Wadhawan, M.**, Kumar, N., Sen, K., Pant, C.C., (2017) Seismotectonics of the trans-Himalaya, Eastern Ladakh, India: constraints from Moment Tensor Solutions of local earthquake data, *Tectonophysics*, doi:10.1016/j.tecto.2017.01.001 (In Press).

Shukla, A. and **Yousuf, B.** (2016). Evaluation of multisource data for glacier terrain mapping: a neural net approach. *Geocarto International*, DOI: 10.1080/10106049.2016.1161078.

Shukla, A. and **Yousuf, B.** (2016). Optimization of neural networks for multisource classification in a glaciated terrain. In: *Geostatistical and Geospatial Approaches for the Characterization of Natural Resources in the Environment*, (N. J. Raju (ed)), Springer publication, 439-441.

Rajeeb Lochan Mishra, Jayangondaperumal, R., Hrushikesh Sahoo, (2016), Active tectonics of Dikrong valley, Northeast Himalaya, India: Insight into the differential uplift and fold propagation from river profile analysis. *Himalayan Geology*, vol. 37, No. 2, 85-94.

Watinaro Imsong, Falguni Bhattacharya, **Rajeeb Lochan Mishra** and Sarat Phukan, Geomorphic evidence of Late Quaternary Displacement of the Karakoram Fault in Nubra and Shyok valleys, Ladakh Himalaya. *Current Science* (In Press).

Poster/Paper presentations in international/ national conferences

Prasath, R.A., Paul, A., Singh, S., (2016), Upper crustal stress and fluid-fault interactions in the Garhwal Himalaya. Presented at the December 2016 *Graduate Virtual Poster Showcase, AGU Showcase*, Washington, DC.

Parija, M.P., Kumar S., and Biswal, S., (2016). Microseismicity, Tectonics and seismic potential in the Western Himalayan segment, NW Himalaya (India) region. *Annual Fall meeting of AGU* from date 12-16 December, 2016. Moscone center, San Francisco, California, USA.

Yousuf, B., Shukla, A. and Arora, M. K. (2016). Optimal Selection of SVM parameters for glacier facies mapping at sub-pixel level. In: *ISRS-ISG National Symposium on "Recent Advances in Remote Sensing and GIS with Special Emphasis on Mountain Ecosystems*, Dec 7-9 2016, Indian Institute of Remote Sensing, Dehradun.

Ghosh, S., Philip, G., Suresh, N., Kanaujjiya, S., and Champati Ray P.K. (2016). Remote Sensing data analysis for mapping of active faults towards earthquake hazard assessment in the Trans-Yamuna segment of north-western Himalaya. *National*

Symposium on "Recent Advances in Remote Sensing and GIS with Special Emphasis on Mountain Ecosystems, Dec 7-9 In: ISRS-ISG2016, Indian Institute of Remote Sensing, Dehradun.

S. Khogenkumar & A. Krishnakanta Singh (2016). Multiple stage magmatism during the evolution of Nagaland-Manipur ophiolites, Northeast India: Evidence from geochemical and mineralogical characteristics of volcano-plutonic mafic rocks. *Goldschmidt Conference 2016* - Yokohama, Japan.

PhD thesis submissions

Shubhra Sharma submitted her thesis entitled "*Palaeo landslide – Induced damming and the resultant geomorphic landscape: case study of the middle Satluj valley near Sunni/Tattapani (Shimla/Mandi Districts), Himachal Pradesh, India*" at Department of Geography, HP University, Shimla Supervisors: Dr. S.K. Bartarya and Prof. B.S. Marh

Rajeeb Lochan Mishra submitted his PhD thesis entitled "*Paleoseismic investigation along the Himalayan Frontal Thrust (HFT), between the meizoseismal zones of the 1934 Bihar-Nepal and 1950 Tibet-Assam earthquakes, North Eastern Himalaya*" at Utkal University, Bhubaneswar, Odisha, on 28/12/2016. Supervisors: Dr. R. Jayangondaperumal (WIHG) and Prof. H. K. Sahoo (Utkal University).

Watinaro Imsong submitted her PhD thesis entitled "*Geomorphological Appraisal of Neotectonic Activities in the Shillong Plateau, Northeast India*" at Department of Geological Sciences, Gauhati University, Assam on 22.12.2016 Supervisors: Dr. Swapnamita, C. Vaideswaran and Dr. Sarat Phukan.

ILLUMINATING ARTICLES

What if you can present your poster without worrying about travel grants?

Sharing one's research in international platforms like conferences, meetings, and symposiums etc., is indeed an important task, like publishing research work through periodicals viz., journals and magazines. Being early career scientists like us (Ph.D. students), the interactions with seniors and experts, which happen to be part of such platforms around the globe and their inputs to our research work, enhance our understanding in shaping our work for publication and for future research plans and tactics. These eye-opener platforms will give us the future opportunities that will benefit us. Nonetheless, being earlier career researchers, it's hard to cope with the fund arrangements required for travel and registration purposes and the extended time, which is to be adjusted from our research tenure. This happens to many of us where we have to call off our presentations for such reasons. The increased use of web link with their handy internet access in the modern era, has given us a chance to explore a solution to this issue.

As of now, in the earth sciences community, American Geophysical Union (AGU) is providing an opportunity to the Graduate (PhD research Scholars) and Undergraduate (M.Sc/M.Tect/M.S) students to present their work virtually (though an online facility). The Virtual Poster Showcase (VPS) helps us to submit an abstract online (similar to all other conferences) and an online database to upload the softcopy of the

respective poster and a self-explanatory video (which can also be made by smart phones), showing the first author (graduate/undergraduate students) explaining his/her poster. The posters need not to be printed; it can be displayed through a projector screen or through any desktop PC. The online database has an option to upload one's poster and video (after logging) onto their respective pages, where they have their respective abstracts and posters uploaded.

The videos can also be uploaded through Youtube, a video-sharing website, either as public or private videos, and then the videos can be linked to their respective pages. The VPS provides a concession for research scholars of our country (and all other developing countries) by waiving off the registration fee for our abstracts. After the first phase of submission (abstract, poster and video), the student-authors of the respective posters will have to review two/three posters of other students. By doing this, all the posters will be reviewed by two students and the scores for the contents will then be rated. The third phase will have an exclusive expert review, where the experts like scientists and professors are to review the work presented and rate it, accordingly. During these review processes the student-authors will get their respective questions and comments through the online page and get interacted. After these three phases, at the end of the respective sessions' showcase, the winners based on their ratings will be announced and financially appreciated by providing travel grants and free registrations at the next years' AGU Fall meeting. All the participants will get the participation certificate and their abstract will be posted in an online database with citations.

The online conferences are emerging in the modern era and we hope to have many more in the upcoming years in our country too. It is useful to be benefitted and to showcase our work freely towards the scientific community with minimum requirements.

-Arun Prasath R (JRF)

The Sahel - An Example of Climatic Variability and Human Existence

The Sahel is located in North Africa between latitudes 14°N and 18°N. Bounded to the north by the dry Sahara and to the south by the grasslands of the Sudan, the Sahel is a semi-arid region of variable rainfall. Precipitation totals may exceed 50 cm in the southern portion while in north rainfall is scanty. Yearly rainfall amounts are also variable as a year with adequate rainfall can be followed by a dry year.

During winter, the Sahel is dry, but as summer approaches, the Inter Tropical Convergence Zone (ITCZ) with its rain usually moves into the region. The inhabitants of the Sahel are mostly nomadic people who migrate to find grazing land for their cattle and goats. In the early and middle 1960s adequate rainfall led to improved pasture land; herds grew larger and so did the population. However in 1968, the annual rainfall did not reach as far north as usual, marking the beginning of a series of dry and severe drought year.

Rain fell in 1969, but the totals were far below those of the favorable years in the mid-1960s. The decrease in rainfall, along with overgrazing, turned thousands of square kilometers of pasture into barren wasteland. By 1973, when the severe drought reached its climax, rainfall totals were 50 percent of the long-term average

and perhaps 50 percent of cattle and goats had died. The Sahara desert had migrated southward into the northern fringes of the region and a great famine had taken the lives of more than 100,000 people. Many more of the 2 million or so inhabitants would have perished had it not been for massive outside aid.

Although low rainfall years have been followed by wetter ones, relatively dry conditions have persisted over the region for the past 30 years or so. The wetter years of the 1950s and 1960s appear to be due to the northward displacement of the ITCZ. The drier years, however appear to be more related to the intensity of rain that falls during so-called rainy season. But what causes the lack of intense rain? Some scientists feel that this situation is due to a biogeophysical feedback mechanism where less rainfall and reduced vegetation cover modify the surface and promote a positive feedback relationship; Surface changes act to reduce convective activity, which in turn reinforces the dry conditions.

Since the mid-1970s the Sahara Desert has not progressively migrated southward into Sahel. In fact, during dry years, the desert migrates southward but in wet years, it retreats. By the same token, vegetation cover throughout the Sahel is more extensive during the wetter years. Consequently desertification is not presently overtaking the Sahel, nor the albedo of the region showing much year-to-year change.

So the question remains: Why did the Sahel go from a period of abundant rainfall in 1950s and early 1960s to relatively dry conditions since then? Was there a large change in the surface albedo brought on by reduced vegetation? Does this relatively dry spell indicate a long-term fluctuation in climate, or will the wetter year of 1950s will return? And if global temperatures rise into the next century, how will precipitation pattern changes? At present there are no answers.....

-Satyabrata Das (JRF)

Cyber Security; you should not overlook

In this cloud computing era, almost all sections of the nation whether government offices, military, research institutions and corporates use cyber space for data storage and communication. This communication, sometimes, may get prone to a cyber-attack. The protection of computer and network from such unwanted access/attack is known as cyber security.

The cyber-attack is generally of two types; active and passive. The active one involves collection, change and destruction of data using malware (virus, worm and Trojan horse) while passive one does consistent data observing through web-tapping/wire-tapping.

In order to avoid these slow poisoned attacks, security can be achieved in two ways; standard and common practices. The standard practice comprises norms, formulated by International organization for standardization (ISO) and International electro-technical commission (IEC). The common practices consist the usage of antivirus, blacklisting (to some doubtful websites), penetration test (intentional insertion of malware to check the effectiveness of security) and cryptography (codified message transmission).

The cyber security issues are no more confined to the financial

institutions and now a days, academics institutions face frequent breach in their data portals. The range of attacks spans from data theft from retailer to the hacking of defence ministry website, UK. The famous academic example includes that of University of Maryland, where information dating back to 1998, including names, social security numbers, dates of birth, and university identification numbers for over 300,000 people affiliated with the university on two campuses was stolen. India is not far from the reach of such attacks as revealed by the study, carried out by IBM and the Ponemon Institute, in which it was found that India is the most targeted country for data breaches.

Thus, I converge my thinking cloud by saying that as you cannot build a stable house until the foundation is sustainable similarly you can't protect your imperative statistics in cyber cloud/space, if you are not well protected.

-Vipin Kumar (SRF)

NEW

Science Updated

....our newest section for keen minds.

The Wilson Cycle: Did cyclicity take place in the ancient tectonic regimes as it does in the modern plate tectonics?

Major tectonic plates of the present day (like the Pacific oceanic plate and the Indian continental plates) which occupied the outermost shell of our planet Earth were once a single supercontinent i.e. the PANGAEA. This supercontinent existed ~300 million years ago which since then broke into its present form by continental drift. Despite the fact that 'PANGAEA' was a recent supercontinent, its origin is still a debate between two alternative theories; (1) the ancient crust was actually a single supercontinent, the first of its kind, and it broke up into its present form, and (2) there were a series of supercontinents in different geological time periods, and the recent one was 'PANGAEA' that broke up into its present form. Both of these theories are favourable with the cyclicity in plate tectonics i.e. 'WILSON CYCLE' (WC) or 'the Supercontinent Cycle' (SC), first proposed by the Canadian Professor J. Tuzo Wilson in 1965 (published in Nature) after many of his own advancements over ~10 years. The WC explains the formation and the processes involved in the plate tectonics through 5-9 stages, which are the stable craton, hot spot/rifting, early and full divergent margins, volcanic arc mountain building, island arc mountain building, cordilleran mountain building, continent-continent mountain building, and again a stable (continental) craton. Please refer to the accompanying figure for the example of WC.

Since, the past 200 years of geodynamic modeling, from the first geological model of Sir James Hall in 1815 (For special issue: <http://www.sciencedirect.com/science/journal/02643707/100>), various studies have been carried out which give us a better understanding of the geodynamic and tectonic processes. For many years, it has been unclear whether the tectonic processes of the ancient earth's crust and mantle (more than 1.5 to 2.6 billion years, geologically the Precambrian and Proterozoic era) follow the WC as much as the younger regions like the Alpine-Himalayan belt (less than 500 million years) do.

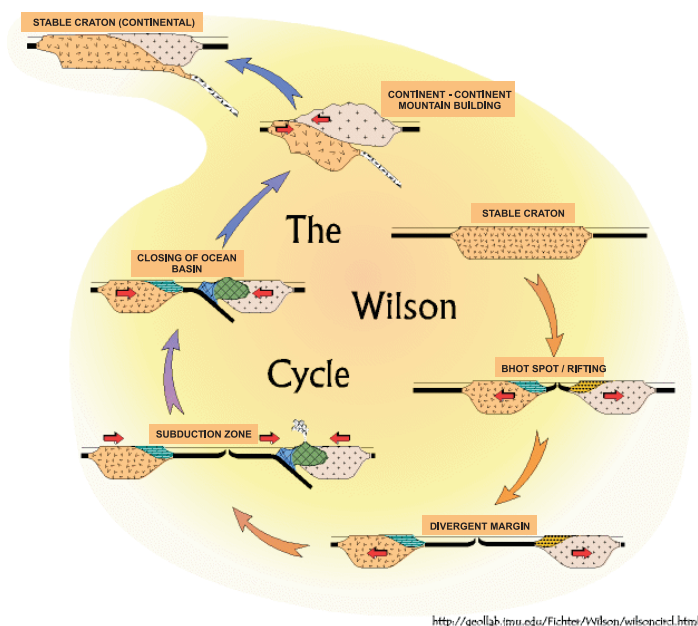


Figure shows stages of a typical Wilson cycle

The study conducted by Cooper et al (2016) published in Tectonophysics, Caxito et al (2016) published in Precambrian Research, Gua et al (2016) and Petersen and Schiffe (2016) published in Gondwana Research (and the references mentioned therein) provide us a conclusion to the debate. Various recent studies viz., seismology, paleo-magnetic, gravity, Global Positioning System (GPS), and other geological studies have been reviewed in the aforementioned studies to evaluate the WC theory to its next level of understanding. While the study in the Precambrian research presents a complete Wilson cycle recorded within the Riacho do Pontal Orogen of NE Brazil, one of the oldest orogens on the earth's crust (neo-Proterozoic age, nearly 1000-500 million years), a review of the previous studies by Cooper and team provides an insight to the comparison between ancient and younger orogens. These studies suggest that the modern and ancient accretionary processes, the structures they produce and the structures preserved in the oldest stable cratons and continents are indeed having commonalities which is further evidenced by the data generated through advanced techniques like receiver functions, anisotropic structures, seismic (earthquake related) observations, seismic tomography, imaging and discontinuity structures. The study by Cooper and team put forward few interesting questions viz., the reason behind the ability/inability of the younger lithosphere (crust and part of upper mantle) to retain the evidence of the deformation; the reason behind the complete destruction of few ancient cratons, while other few that retained the evidence on their exteriors (as shown by Guo and team). These studies of the past six months (Jul-Dec, 2016) provide a view that the ancient processes and structures of the continental drift indeed follow the 'WILSON CYCLE'.

-Arun Prasath R (JRF)

...natural moments, captured.



-Aravind A (JRF)



-Anshuman Misra (SRF)



-Tanuj Shukla (SRF)

FIELD PHOTOGRAPHS



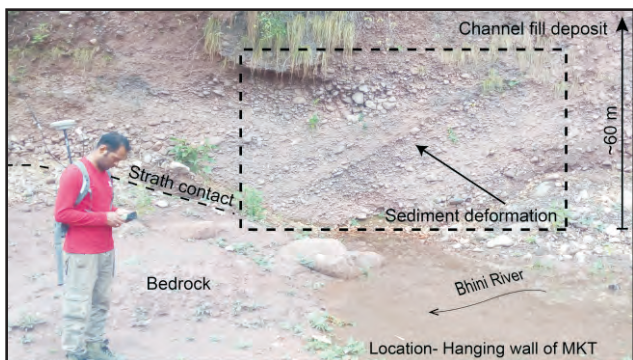
Spatial variability in valley width in response to regional tectonics, lithological variation and precipitation variability in Satluj Valley.

-Vipin Kumar (SRF)



A segment of ophiolite which is exposed in the Mahe section, Eastern Ladakh, India. Ophiolites (or Snake Stones) indicates the obducted part of oceanic crust emplaced onto continental crustal rocks.

-Lakhan Singh (JRF)



Soft sedimentation deformation structure across the Mandili Kishanpur Thrust (MKT/MWT) observed in the Bhini River section near Billawar in Jammu and Kashmir.

-Shraddha Jagtap (JRF)



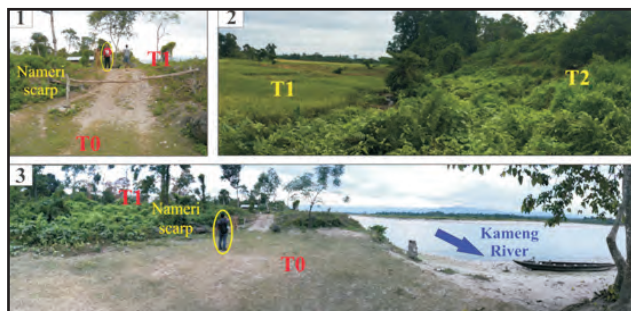
Pictorial view of a sediment laden meltwater stream emerging from a debris-covered snout (~4300 m asl) of Bangni Glacier, Dhauliganga River basin towards the end of ablation season (2016).

-Anupam Gokhale (SRF)



Interbedded gravels in massive sandstone beds can be used for the identification of bedding direction and dip. Location- Miao, Noa Dihing River, Arunachal Pradesh

-Atul Kumar (JRF)



Figures 1, 2 and 3 show the truncated terraces along the Kameng River, northeast Himalaya

-Rajeeb Lochan Mishra (SRF)

EDITORIAL TEAM

Vipin, Arun, Tanupriya, Atul, Khogen and Shraddha
CO-ORDINATOR
Dr. Gautum Rawat