Dr. Ayanangshu Das

Researcher
Voice: +91-8637816853/9874589317

Date of Birth: 25th August, 1992
E-mail: *ayanangshudas073@gmail.com*

Profile:

A researcher in the field of geology holding a Ph.D. on geodynamics related to magma emplacement processes using modern geophysical techniques like Anisotropy of Magnetic Susceptibility (AMS), Rock-magnetism and Paleomagnetism. Research knowledge on magnetic minerals. Studied Geology, Physics and Mathematics during BS/MS Program. Widely published in national and international journals. Currently seeking a position in a premier organization where I can grow intellectually and contribute my knowledge gained during my research tenure.

Areas of interest:

Anisotropy of magnetic susceptibility (AMS), Rock and paleomagnetism, Magnetic minerals, Structural Geology, Tectonics and Geo-dynamics, Solid Earth Geophysics.

Academic qualification:

Degree	University/Board	Subject	Year	%
Ph.D.	IISER Bhopal	Geophysics/Geoscience	2022	CPI 8.67 (PhD course work)
M.Sc.	Jadavpur University	Applied Geology	2016	71.9
B.Sc.	Jadavpur University	Geology (Hons.)	2014	70.5
HS (10+2)	W.B.C.H.S.E	Physics, Chemistry, Maths, Bio,	2010	84.8
Secondary (10)	W.B.B.S.E	-	2008	89.0

Research experience:

- **PhD** (IISER Bhopal, 2017-2021) Geodynamics of Dhule-Nandurbar Deccan (DND) dyke swarm emplacement: *Rockmagnetic, paleomagnetic and magnetic fabric investigations*.
  Ph.D. supervisor: Dr. Jyotirmoy Mallik (jmallik@iiserb.ac.in)
  Extensively used modern geophysical techniques like Anisotropy of Magnetic Susceptibility (AMS), Rock magnetic and paleomagnetic analysis to understand the role of *tectonism induced fractures* in the emplacement of large Igneous Province.
- **M.Sc. dissertation** (Jadavpur University, 2015-16) Probable slip surface mapping in land slide prone zone, Paglajhora region, Kurseong, by using geoelectric (Dipole-dipole and Schlumberger) resistivity method.
- **Summer research internship** (IIT Bombay, June-July, 2015**):** Understanding of the doming/folding caused by upward stress exerted by anorthosite diapir**.**
- **Summer research internship** (Jadavpur University, June-July, 2013) Analysis and mapping of magnetic susceptibility data from fly ash samples collected from in and around the industrial locality of Bandel-Triveni, Hooghly, India

Technical Skillsets:

- Skilled in application of *modern geophysical proxy techniques* like *Anisotropy of Magnetic Susceptibility (AMS), Rock magnetic* and *paleomagnetic* analysis in understanding the significance of the *tectonic fractures* in case of large volcanic province emplacement and its geodynamic modelling.

- Hands on experience in identifying *magnetic mineralogy* and its *domain structure* using *rock-magnetic* methods.

- First-hand skill in *analogue modelling of fault plane propagation* using various materials.

- First-hand skill in FEA (finite element analysis) based numerical modelling of fault plane using ABAQUS.

- First-hand skill in *near-surface maximum horizontal stress measurement* using latest and cost-effective Fracture-induced *electromagnetic radiation (FEMR) technique* for *stress mapping* in neotectonically active area.

- Extensively trained in thin section preparation for transmitted light, reflected light and scanning electron microscopic analysis of the prepared thin section. Proficient in handling and operating *drilling and coring* instrument for sample preparation for AMS and rock magnetic technique.

- First-hand experience in *slip-surface mapping and slope stability modelling* in landslide prone area using geophysical resistivity (Dipole-dipole and Schlumberger) methods and FEMR technique.

- Experienced in extensive *geological field mapping and structural mapping* in diverse geological terrains (Continental flood basalt province, Lesser Himalayan orogeny, Metasedimentary terrain, older metamorphic complex, rift settings, Shear zone, Gneissic complex, marine sedimentary regime etc.)

- Basic understanding about open cast and underground mines, identification of primary sedimentary structures form cores, borehole log data interpretation**,** seismic section interpretation, mining and drilling operations.

Instrumental proficiency:

Instruments	*Extensively handled for measurement of*
Scanning Electron Microscope (SEM)	Mineralogical identification
KLY-4S Kappabridge, AGICO	Anisotropy of Magnetic Susceptibility (AMS)
MFK-1A Kappabridge, AGICO	Temperature dependent susceptibility
ASC impulse magnetizer (ASC Scientific, USA)	Isothermal Remanent Magnetization (IRM)
Molspin spinner magnetometer (Magnetic Measurements, U.K)	Magnetization
Bartington susceptibility measuring unit with MS2B sensor	Magnetic susceptibility
SQUID VSM instrument	Hysteresis loops and associated parameters
Angel-M, JSC (VNIMI, Russia)	Geogenic Electromagnetic Radiation (EMR) due to propagation of nano and micro-cracks

Software skills

- Proficient in Microsoft suits.
- Proficient in Surfer, Georose, Stereonet, Anisoft, Rockmag Analyzer.
- Basic understanding in numerical modelling of fault plane using Abaqus.

Field Experience:

Field Area	**Objective**	**Year**
Dykes of Panchmari-Tamia and surroundings (Part of Narmada-Satpura-Tapi [N-S-T] dyke swarm of Deccan Volcanic Province [DVP])	Sample collection for AMS, Rock-magnetic, paleomagnetic and petrographic analysis.	2021
Dhule Nandurbar Deccan (DND) dyke swarm, a part of the larger N-S-T dyke swarm of DVP	Sample collection for AMS, Rock-magnetic, paleomagnetic and petrographic analysis.	2017, 2018 (Ph.D. field)

Darjeeling-Sikkim lesser Himalaya	Linear profiling and horizontal measurement of FEMR for determination of near surface maximum horizontal stress around the thrust sheet of the Darjeeling-Sikkim Himalaya	2018
Narmada rift zone in and around Jabalpur-Itarsi region	Linear profiling and horizontal measurement of FEMR for determination of near surface maximum horizontal stress along Narmada-Son lineament	2017
In and around Kurseong, Lesser Himalaya	Geo-electric resistivity survey (dipole-dipole and Schlumberger array) and basic structural mapping in landslide prone area of Kurseong,	2015-16
Joda East Fe ore mine, Bamebari Mn ore mine, Khondbond Fe-Mn mine, Noamundi Fe ore mine	Visit to the mines to learn about the operational process and mining techniques, also visited ICP chemical laboratory of TATA steel.	2016
Ghatshila, Tetuldanga and Singbhum shear zone	Extensive training in identification and attituded determination of linear and planner structure, Detail study of the relationship between fold axis and mineral lineations, shear sense and finite strain analysis, primary structures, Intense structural mapping of tectonically deformed area like Ghatshila, Tetuldabga, strain analysis from the structural features, paleocurrent analysis. Shear zone mapping etc.	2015
Chandipur tidal flat	Facies (Aeolian-swamp-beach-bar and interbar-tidal flat facies) wise sedimentological studies	2014
Jabalpur along Narmada rift	Geological mapping, detail structural mapping and demarcation of metamorphic grade boundaries in field.	2013
Maithon of Chhotanagpur Gneissic complex	Basic geological mapping, identification of structural features and attitude determination, visit to the Ramgarh open cast and underground mines, visit to the Maithon Dam and understanding of its geo-engineering implications.	2012

Teaching experience:

- Served as *teaching assistant* in Structural geology (lab), Metamorphic petrology (lab), Sedimentology (lab), Structural geology (theory), Geochemistry, Fuel geology, Evolution of Indian plate, Introduction to Earth and Environmental sciences, Earth material and processes and Solid earth geophysics courses during last four years.
- *Mentored* a group of *undergraduate interns* from different institute during their summer internship (May-June, 2018) at IISER Bhopal on the project '*The effect of internal coefficient of friction of the fault plane on the fault propagation in elasto-plastic domain*'.
- *Mentored* a *post-graduate student* for her *MS dissertation* in the field of paleomagnetic analysis of Deccan Trap.

Awards and Honors:

- Prof. D Lal best paper award for the year 2021 from the Indian Geophysical Union (IGU) for the paper *"Geodynamics related to late-stage Deccan volcanism: insights from paleomagnetic studies on Dhule-Nandurbar (DND) dyke swarm"*

- 'Financial Assistantship for Attending Conferences (FAAC)' Scheme sponsored by IISERB for attending American Geophysical Union (AGU) Fall meeting 2019, San Francisco, USA, 9th to 13th December, 2019.
- Institute fellowship through Gate-2017.

Presentation:

- Poster presented in the *American Geophysical Union (AGU) Fall meeting 2019*, San Francisco, USA. Published: ***Das, A.*** and Mallik, J. (2019) Can Anisotropy of Magnetic Susceptibility (AMS) technique detects flow fabric? Insight from Nandurbar-Dhule dyke swarm, India. Poster-GP23B-0799.
- Oral presentation in the *Rock Deformation & Structures 2021 (RDS-VI)*.
  Published: **Das, A.**; Mallik, J. and Banerjee, S. (2021) Determination of magma flow pattern in Dhule-Nandurbar Deccan (DND) dyke swarm: A rock-magnetic and magnetic fabric investigation.

Key publications/conference proceedings:

- **Das, A.**; Mallik, J. and Banerjee, S. (2021) Characterization of the magma flow direction in the Nandurbar-Dhule Deccan dyke swarm inferred from magnetic fabric analysis. **Phys. Eart. Planet. Inter**., 319.
- **Das, A.**; Mallik, J. and Shajahan, R. (2021) Geodynamics related to late-stage Deccan volcanism: insights from paleomagnetic studies on Dhule-Nandurbar (DND) dyke swarm. **J. Indian Geophy. Uni.**, 2021, v.25(6), pp.28-44.
- **Das, A**. and Mallik, J. (2020) Applicability of AMS technique as a flow fabric indicator in dykes: Insight from Nandurbar-Dhule Deccan dyke swarm**. Int. J. of Ear. Sci**., v.109, pp.933-944.
- Das, D; Mallik, J.; Das, S.; Deb, T., **Das, A.** and Bandyopadhyay, K. (2020) Active thrust induced realignment of recent near-surface stresses in the Darjeeling-Sikkim Himalayas: Reasons and Implications. **J. Struct. Geol.,** 145(7).
- Das, S.; Mallik, J.; **Das, A.** and Bandyopadhyay, K. (2019) Evaluation of Maximum Horizontal near surface stress (SHmax) azimuth and its distribution along Narmada-Son lineament, India by geogenic Electromagnetic Radiation (EMR) technique. **J. Geod.,** v.130. pp.1-17.
- **Das, A.**; Mallik, J. and Bandyopadhyay, K. (2019) Establishment of correlation between Anisotropy of Magnetic Susceptibility and magma flow fabric: an insight from Nandurbar-Dhule dyke swarm of Deccan Volcanic Province**. Curr. Sci**., v.116(9), pp.1468-1471.
- Mallik, J.; **Das, A.**; Das, S. and Bandyopadhyay, K. (2019) Genesis of Dhuadhar Falls, Bhedaghat, Madhya Pradesh**. Curr. Sci**., v.116(8), pp.1292-1294.
- Das, S.; Mallik, J.; **Das, A.**; Bandyopadhyay, K. (2018) Comparison of stress azimuth data derived by geogenic Electrmagnetic Radiation (EMR) technique and from the analysis of exhumation joints**. Curr. Sci**., v.115(6), pp.1039-1041.
- Mondal, S.; Chatterjee, S.; Maiti, R.; Gain, D; **Das, A.** and Sinha, S. (2017) Magnetic susceptibility as a proxy for pollution in Triveni-Bandel area, Hooghly district, West Bengal, India. **Curr. Sci**., v.112(11), pp.2306-2311.
- Sen, S.; Ganguly, S; **Das, A.**; Sen, J. and Dey, S. (2016) Renewable energy scenario in India: Opportunity and challenges. **J. Afr. Ear. Sci.,** v.122, pp.25-31.

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