Wow, what a strange year! Yet with international travel stopped, conferences postponed, and campuses closed we’ve adapted. As can be expected, we’re a little light on news. Hopefully 2021 is a much better year worldwide! In the meantime, hopefully you enjoy the cartoons below.

I’d like to welcome Peter Dowd and our new IAMG council and thank Jenny McKinley and a our outgoing council for all their hard work over the last four years.

Katie Silversides

Contents

SUBMIT NOMINATIONS FOR 2021 GEORGES MATHERON LECTURER AND 2022 IAMG DISTINGUISHED LECTURER.............1
DISTINGUISHED LECTURER UPDATES................................1
PRESIDENT’S FORUM ................................................3
MEMBER NEWS .........................................................4
PAST PRESIDENT PROF JENNY MCKINLEY ELECTION TO THE IUGS EXECUTIVE COUNCIL..........................4
SPRINGER ENCYCLOPEDIA OF MATHEMATICAL GEOSCIENCES .4
PRINCE SULTAN BIN ABDULAZIZ INTERNATIONAL WATER PRIZE..................................................4
IEEE GEOSCIENCE AND REMOTE SENSING SOCIETY (GRSS) DISTINGUISHED LECTURER (DL)..................4
DIVERSITY AND INCLUSION IN GEOSCIENCE.................4
STUDENT NEWS ..........................................................5
NANCY STUDENT CHAPTER ........................................5
ABSTRACTS FROM 2019 RESEARCH GRANT REPORTS...........5
UPCOMING MEETINGS .................................................6
IAMG JOURNAL CONTENTS ..........................................6-11

Submit nominations for 2021 Georges Matheron Lecturer and 2022 IAMG Distinguished Lecturer

For details about prerequisites for nominations please see the IAMG web site http://www.iamg.org/ and click on Awards

Proposals should include a curriculum vitae and a short statement summarizing the relevant qualifications of the nominee.

Deadline 31 December 2020, email nominations to christien.thiart@uct.ac.za

Distinguished Lecturer Updates

The IAMG 2020 Distinguished Lecturer, Professor Peter Atkinson, will continue his lectures into 2021 due to Covid-19. His presentations for 2020 were:

IAMG Student Chapter Freiberg, 12th November. Title: Implications of the PSF for downscaling and data fusion in remote sensing

International Geospatial Week, Colombia, 26th November. Title: Trends in geospatial data science and remote sensing

The IAMG 2021 Distinguished Lecturer is Jaime Gómez-Hernández. Please contact Jaime or Peter if you are interested in arranging a lecture.

IAMG is on LinkedIn, Twitter and Facebook!

The mission of the IAMG is to promote, worldwide, the advancement of mathematics, statistics and informatics in the Geosciences
Dear IAMG Members,

This is my first letter as President of IAMG and, on behalf of the new Council, my first duty is to thank Jennifer McKinley and the members of the previous Council for the work they have done over the past four years and for the very strong and healthy state in which they have left the IAMG. My second duty is to thank the chairs and members of the various Council committees for their significant contributions to the operation of the IAMG during the tenure of the previous Council.

Your new Council was formally installed on 1st September 2020. Some of us, including me, are new to the Council and its committees and we are in the process of familiarising ourselves with the structure and operation of the IAMG.

As a priority, I want to ensure as wide a participation as possible in IAMG activities in terms of regions/countries, gender, diversity and disciplines and I would welcome suggestions from members on how we could promote and achieve this aim. As a start, we called for expressions of interest in chairing the various IAMG committees for the tenure of the new Council. Thank you to those members who responded to this call. We are now in the process of confirming the chair positions. There will be other opportunities for members to take an active part in the IAMG and I encourage you to respond to them when they arise.

The mission of the IAMG is to promote, worldwide, the advancement of mathematics, statistics and informatics in the Geosciences. We are also committed to promoting diversity, inclusion, fairness, impartiality and democracy. A full statement of our mission and commitments can be found on the IAMG website.

In addition to our mission, values and commitments, it is useful to consider the wider role of the IAMG as a scientific association. A recent study identified five main roles of scientific associations: communication among peers, promotion of research, science dissemination, representation of professional interests and policy advice. In my view we cover the first four of these reasonably well. The fifth role is a means of contributing knowledge and reason to decision-making and to the formulation of policy. Science should be a resource for others. We welcome suggestions from members on how we can continue to communicate and disseminate our research effectively in the current environment.

I have a particular interest in informing political policy with relevant science. For the past few years I have been a member of the Science meets Parliament group for the Government of the state in which I live. We have four meetings a year to which we invite a scientist to make a presentation to politicians on a specific policy-related topic with the expectation that it might inform policy. Some of these meetings have focussed on matters directly relevant to the mathematical geosciences. There are similar initiatives in other states in Australia and in other counties. It is somewhat more difficult to do this on the global scale of IAMG, but perhaps we could exchange views and strategies on how this might be fostered at the local or regional area. It would be particularly useful to hear from IAMG members who have been involved in successfully informing policy and/or in successfully contributing to the public understanding of science relevant to policy.

Through the IAMG Council we could consider ways to increase collaboration with various agencies and to advance the mathematical geosciences as a resource that can inform policy decisions on natural resources and the environment as well as promoting the individual disciplines that comprise the mathematical geosciences. There are several industry areas relevant to the mathematical geosciences that could also be involved.

Turning to our own dissemination of research, the COVID pandemic continues to impede the traditional forms of conferences and meetings and it is likely to continue to do so throughout 2021.

Several members have made suggestions for virtual conferences and other forms of communication and dissemination. In my own field, I have found short (up to two hours) webinars to be a useful means. A speaker presents a topic for 45 minutes or so, followed by a panel discussion of 30 minutes and then an open question and answer session for all participants. These events can be recorded and made available as a resource for others. We welcome suggestions from members on how we can continue to communicate and disseminate our research effectively in the current environment.

I look forward to the next four years as your President and, together with your Council, I welcome your input during this period.

Yours sincerely,

Professor Peter Dowd, FREng, FTSE
President, International Association for Mathematical Geosciences

---


Past President Prof Jenny McKinley Election to the IUGS Executive Council

IAMG Past President Jenny McKinley has been elected as a Councillor (2020-2024) to the International Union of Geological Sciences (IUGS) Executive Council

https://www.iugs.org/

The International Union of Geological Sciences (IUGS) has 121 national members, represents over a million geoscientists, and is one of the World’s largest scientific organizations. The IUGS in partnership with UNESCO encourages international co-operation and participation in the Earth sciences in relation to human welfare and is a member of the International Science Council (ISC).

As an affiliated organisation, the IAMG has a long history of successful collaboration with the IUGS. Most recently past IAMG president Prof Qiuming Cheng was the IUGS president 2016-2020 and remains on the new IUGS Council as Past President. The new IUGS President is Prof John Ludden (UK) and the new Vice President is Prof Hassina Mouri (South Africa).

Jenny says ‘I’m delighted and honoured to be elected as a Councillor 2020-2024 to the IUGS Executive Council. I’m pleased to continue the work of IAMG colleagues in establishing productive links with the IUGS to serve the international geoscience community.’

Springer Encyclopedia of Mathematical Geosciences

Springer’s “Encyclopedia of Mathematical Geosciences” is being edited by B. S. Daya Sagar, Qiuming Cheng, Jennifer McKinley, and Frits Agterberg with the support of nine Section Editors. This Encyclopedia that is scheduled for completion at the end of 2021 would be a complete and authoritative reference work. We expect that it will provide a concise explanation of each relevant term related to the Mathematical Geosciences.

In total, the Encyclopedia of Mathematical Geosciences is expected to consist of ~430 entries. There are 39 Category-A chapters, 341 Category-B Chapters (each 1000-3000 words long), and around 50 Category-C chapters (each 500 words long, and these Category-C chapters are brief biographies of eminent Mathematical Geoscientists). We have authors for most Category-A and Category-C chapters, and for 225 Category-B-Chapters. In view of this, we are appealing to all Mathematical Geoscientists to contribute chapters of Category B. Each Category-B chapter is keyword-specific. As of 24th October 2020, the pending 116 keyword-specific chapters that still need authors are listed on the Google-Sheet available at the following link:

https://docs.google.com/spreadsheets/d/1J44xZ44bseRc3ibq b9ojFgGXSux3rhW53iOYPybGaqY/edit#gid=937016950

Mathematical geoscientists who can contribute chapters for the keywords specified on the Google sheet available at the above link, kindly contact any Editor to get the details on how to contribute the chapters for this Encyclopedia. More details about the Springer’s Encyclopedia of Mathematical Geosciences can be seen at https://meteo.springer.com/math_geosciences.

B. S. Daya Sagar, Qiuming Cheng, Jennifer McKinley and Frits Agterberg

Prince Sultan bin Abdulaziz International Water Prize

The Prince Sultan bin Abdulaziz International Water Prize, probably the most important prize, worldwide, in the area of water resources, has been awarded to Jaime Gómez-Hernández.

The award was presented in recognition for his work in proposing that natural heterogeneity is not well represented by multiGaussian fields, and developing the ‘self-calibrating method’ using pilot points for the stochastic inversion of natural heterogeneity, which yields an estimate of the parameters, but also an estimate about their uncertainty. Details at https://psipw.org/index.php?option=com_content&view=article&id=209&Itemid=129&lang=en

IEEE Geoscience and Remote Sensing Society (GRSS) Distinguished Lecturer (DL)

Prof. B. S. Daya Sagar of the Systems Science and Informatics Unit (SSIU) at the Indian Statistical Institute-Bangalore Centre has been appointed as the “IEEE Geoscience and Remote Sensing Society (GRSS) Distinguished Lecturer (DL)” for the period between 2020-2022. It is worth mentioning that he is the first-ever Indian Geoscience and Remote Sensing scientist to get this honor. The GRSS Distinguished Lecturer Program (DLP) is a service of the IEEE Geoscience and Remote Sensing Society and its members across the globe to support GRSS chapter activities. IEEE GRSS DLP’s goal is to provide chapters with access to leading professionals in geoscience and remote sensing and discuss novel topics in current research. This is an opportunity for the GRSS membership across the globe to hear interesting talks about work being done in the fields of interest and to meet some of the prominent members of our Society. More details about this can be seen at http://www.grss-ieee.org/education/distinguished-lecturers.

B. S. Daya Sagar

Diversity and Inclusion in Geoscience

Dario Grana an associate professor in the Department of Geology and Geophysics at the University of Wyoming is currently offering a new class for undergraduate and graduate students on Diversity and Inclusion in Geoscience.

The dramatic events of the last months in the United States challenged us to confront the racial injustices that have long undermined the world. Few STEM fields are less diverse than geosciences. Even worse, this lack of diversity itself poses challenges to overcoming it, limiting recruitment of diverse young geoscientists and allowing systemic racism, sexism, and discrimination to persist. Indeed, we constantly witness how the careers of young scientists are hindered based on race, ethnicity, gender and/or geographical origin, sexual orientation and social prejudice all over the world. Systemic racism and arbitrary discrimination are a big loss for science and humanity.

The purpose of this course is to educate and promote the value of diversity and inclusion and to discuss how our scientific community is affected by racial injustice. In this class, students learn how to support equality, diversity, and inclusivity in academia and in the scientific community. The class includes lectures on implicit bias, inclusive teaching, inclusive geoscience coursework, challenges in achieving diversity, and diversifying geosciences through mentoring. The class also includes four discussion panels on inclusivity in geosciences from underrepresented minority groups, such as Afro-Americans, Latinos and Hispanics, Women, and LGBTQ2S+. Invited lectures on the integration of diversity, equity, and inclusion (DEI) initiatives in geosciences are given by DEI experts and renowned geoscientists, including Dr. Catherine Rihimaki (Princeton University), Prof. Jef Caers (Stanford University), Prof. Mark Clementz (University of Wyoming), Prof. Kira Lawrence (Lafayette College), Dr. Loren Medina Luna (UCAR), Prof. Aradhna Tripati (UCLA), Prof. Ellen Currano (University of Wyoming), Prof. Ebele Atekwana (University of Delaware), Prof. Kamini Singha (Colorado School of Mines), and Prof. Jerry Harris (Stanford University).
Student News
Nancy Student Chapter
1. In October 2019, the board of the IAMG student Chapter has been renewed: Capucine Legentil is president, Paul Baville as treasurer, and Zoe Renat as secretary.
2. In January 2020, we presented the IAMG and the Student Chapter of Nancy to our MSc students.
3. Nicolas Claussolles had defended his thesis in March 2020 about stochastic seismic interpretation of salt bodies, and Nicolas Mastron in April 2020 worked on improving the global coherency of shared earth model using static, dynamic, and geomechanics data. They are Drs now!
4. During the lockdown, we maintained the weekly seminar with presentations done by IAMG student Chapter members and also with outside speakers such as Marcus Apel from Equinor (you can find the news on our website: here).
5. Paul Baville (treasurer) has presented his works at the online AAPG in October 2020 while Corentin Gouache presented at the online EGU.
6. Melchior Schuh-Senlis published an article in Solid Earth about restoring. Corentin Gouache and Yves Frantz are waiting for final reviews on their articles.
7. All Ph.D. students of the Student Chapter presented their works at the RING meeting 2020.

Abstracts from 2019 Research Grant Reports
CG-2019-6: Thibaud Chassin (EPFL) - Title: Shaping 3D virtual environments in accordance with the user’s background and preferences
The representation of urban projects in 3D is a powerful concept that can help local communities to have an accurate idea of the future development of their district or city. However, the public’s understanding of 3D models significantly varies from one person to another, leading to misjudgments or inadequate feedback. To reduce this bias, the use of customized 3D portrayals could improve individual 3D understanding. This study aims at making a first step allowing a semi-automated 3D portrayal personalization. Following the COVID-19 regulations regarding onsite experiments, an online survey has been conducted. Despite the challenging context, more than a hundred participants have completed the study. Several parameters were collected (response times, success rates, camera positions, inputs, etc.) to assess the user’s perception and, by extension, their understanding and preferences. The results suggest that an increase of complexity in the operated task (memorization, lack of interaction) or the portrayal (such as photo-realism) weakens the user’s perception of morphological structures in 3D scenes. However, the contrary does not appear to be always true, even though the user’s perception could be enhanced by visual elements (saliency).

CG-2019-8: Teeratom Kadeethum (Technical Univ. of Denmark) - Title: A Locally Conservative Mixed Finite Element Framework for Coupled Hydro-Mechanical-Chemical Processes in Heterogeneous Porous Media
This paper presents a mixed finite element framework for coupled hydro-mechanical-chemical processes in heterogeneous porous media. The framework combines two types of locally conservative discretization schemes: (1) an explicit scheme for reactive flow, and (2) a three-field mixed finite element method for coupled fluid flow and solid deformation. This combination ensures local mass conservation, which is critical to flow and transport in heterogeneous porous media, with a relatively affordable computational cost. A particular class of the framework is constructed for calcite precipitation/dissolution reactions, incorporating their nonlinear effects on the fluid viscosity and solid deformation. Linearization schemes and algorithms for solving the nonlinear algebraic system are also presented. Through numerical examples of various complexity, we demonstrate that the presented framework is capable of accurately simulating coupled hydro-mechanical-chemical processes in heterogeneous porous media, even when the material properties are strongly heterogeneous and anisotropic.

CG-2019-12: Ben R. Mather (Univ. of Sydney) - Title: High performance computing framework to solve the adjoint to the inverse problem of heat conduction at unprecedented resolution
A common obstacle in Bayesian inversion is the large number of simulations required to adequately sample the posterior density function. For models of thermal structure, this involves solving temperature with prescribed boundary conditions across a mesh populated with constitutive properties, such as thermal diffusivity and heat production, and finding the model that optimally reproduce the available data. We constructed the adjoint to the inverse problem of heat conduction to provide an efficient framework for simulating Earth-realistic models at very fine resolution and that optimally reproduce the available data. We found a linear scaling between the number of inversion variables and the number of simulations to optimize the cost-to-benefit ratio for the optimal trade-off between Curie depth, surface heat flow data, and prior information on the thermal properties of the lithosphere. This is a significant improvement in computational efficiency than traditional MCMC approaches. In Ireland, where we have applied this code, we found the optimized parameters to be in good agreement with geophysical data and quantified the uncertainty of subsurface thermal structure. An open-source Python package, “Conduction” is freely available to reproduce these results and infer the thermal regime of the lithosphere in other geological contexts.

CG-2019-14: Siavash Ghelichkhan (Australian Natl. Univ.) - Title: Revealing the Structure and Evolution of Earth’s Engine in Space and Time
A long-standing challenge in fluid dynamical mantle simulations is integration of the ever-growing disparate datasets in various disciplines of Solid Earth Sciences. For this reason, geodynamicists have turned to large scale optimization methods where models are optimized with regards to various observational datasets. An example is reconstructions of past mantle flow that involve the solution of a geodynamic inverse problem through the adjoint method. This inverse problem aims at finding the (unknown) state of the mantle in the past that naturally evolves into its (known) present-day state by iteratively minimizing the difference between the observed present-day mantle structure and the prediction of a geodynamic model. The present study introduces a new method to test the adjoint method developed for geodynamic models (Frechet derivatives) with respect to model parameters, allowing one to test inverse problems where analytical solutions are not available or the cost to determine many times the associated forward problem is prohibitive. In geodynamics, it has been applied to the restoration problem of mantle flow such as the one shown through the adjoint method. This inverse problem aims at finding the (unknown) state of the mantle in the past that naturally evolves into its (known) present-day state by iteratively minimizing the difference between the observed present-day mantle structure and the prediction of a geodynamic model. This study presents a new test method for the adjoint method developed for geodynamic models (Frechet derivatives) with respect to model parameters, allowing one to test inverse problems where analytical solutions are not available or the cost to determine many times the associated forward problem is prohibitive. In geodynamics, it has been applied to the restoration problem of mantle flow such as the one shown through the adjoint method. This inverse problem aims at finding the (unknown) state of the mantle in the past that naturally evolves into its (known) present-day state by iteratively minimizing the difference between the observed present-day mantle structure and the prediction of a geodynamic model. This study presents a new test method for the adjoint method developed for geodynamic models (Frechet derivatives) with respect to model parameters, allowing one to test inverse problems where analytical solutions are not available or the cost to determine many times the associated forward problem is prohibitive. In geodynamics, it has been applied to the restoration problem of mantle flow such as the one shown through the adjoint method. This inverse problem aims at finding the (unknown) state of the mantle in the past that naturally evolves into its (known) present-day state by iteratively minimizing the difference between the observed present-day mantle structure and the prediction of a geodynamic model. This study presents a new test method for the adjoint method developed for geodynamic models (Frechet derivatives) with respect to model parameters, allowing one to test inverse problems where analytical solutions are not available or the cost to determine many times the associated forward problem is prohibitive. In geodynamics, it has been applied to the restoration problem of mantle flow such as the one shown through the adjoint method. This inverse problem aims at finding the (unknown) state of the mantle in the past that naturally evolves into its (known) present-day state by iteratively minimizing the difference between the observed present-day mantle structure and the prediction of a geodynamic model.
News about CoDaWork: save the date!
The CoDaWork 2021 conference has been postponed to 2022 due to the world pandemic. However the local organizers in Toulouse and the scientific committee invite you to participate in an online event (CoDaDay) on June 31st 2021. There will be five invited talks, and the conference is free of charge. The detailed program will be announced shortly on the CoDa Association website https://www.coda-association.org.

The 36th IGC has been postponed until August 16-21, 2021
The IAMG is collaborating in symposia 35.1 (Mathematical Geosciences and Mineral Resource Evaluation) and 45.10 (Advances in Global Geological Data Sharing and Processing).

EUG 2021 General Assembly
The IAMG is co-organizing the geostatistics session within the EGU 2021 General Assembly.

Online-conference “Marginal Seas – Past and Future”
Dec 16/17, 2020
During the annual conference of the International Association for Mathematical Geosciences “IAMG 2019”, held at State College, Pennsylvania, USA, August 10-16, 2019, an international and interdisciplinary group of scientists launched an initiative “Eurasian Marginal Seas – Past and Future (EMS)”. The initiative’s objective is to develop a generally accessible methodology, based on big data analyses and numerical modeling, to answer questions related to environmental changes in marginal seas during the Last Glacial Cycle in order to generate future scenarios for this century. Modeling should help to work out strategies for balancing the protection of the environment and the economic use of marginal sea resources.

The initiative resulted in an international Marginal Seas network, supported by IAMG and the DDE Big Science Program of the IUGS. However, communication within the network slowed down after the 36th IGC had been postponed due to the pandemic which dramatically hampers face-to-face meetings. Having learned from these lessons, we are continuing our work via electronic communication means. When discussing the possibilities of modeling the processes in marginal seas, we realized that we still have to close gaps in our basic knowledge by conducting baseline studies before - or in parallel - numerical models describing processes in marginal seas can be generally used. The on-line conference organized by the Institute of Marine and Environmental Sciences, University of Szczecin, Poland, together with partners of the Marginal Seas network will serve as a contribution to these baseline studies. For details, please visit the conference website https://baltic.earth/EMS2/ and be cordially invited to attend the event and contribute to the discussion. A total of 25 invited lectures will be presented and discussed in three topical cycles in order to generate future scenarios for this century. Modeling should help to work out strategies for balancing the protection of the environment and the economic use of marginal sea resources.

EUG 2021 General Assembly
The IAMG is co-organizing the geostatistics session within the EGU 2021 General Assembly.

Online-conference “Marginal Seas – Past and Future”
Dec 16/17, 2020
During the annual conference of the International Association for Mathematical Geosciences “IAMG 2019”, held at State College, Pennsylvania, USA, August 10-16, 2019, an international and interdisciplinary group of scientists launched an initiative “Eurasian Marginal Seas – Past and Future (EMS)”. The initiative’s objective is to develop a generally accessible methodology, based on big data analyses and numerical modeling, to answer questions related to environmental changes in marginal seas during the Last Glacial Cycle in order to generate future scenarios for this century. Modeling should help to work out strategies for balancing the protection of the environment and the economic use of marginal sea resources.

The initiative resulted in an international Marginal Seas network, supported by IAMG and the DDE Big Science Program of the IUGS. However, communication within the network slowed down after the 36th IGC had been postponed due to the pandemic which dramatically hampers face-to-face meetings. Having learned from these lessons, we are continuing our work via electronic communication means. When discussing the possibilities of modeling the processes in marginal seas, we realized that we still have to close gaps in our basic knowledge by conducting baseline studies before - or in parallel - numerical models describing processes in marginal seas can be generally used. The on-line conference organized by the Institute of Marine and Environmental Sciences, University of Szczecin, Poland, together with partners of the Marginal Seas network will serve as a contribution to these baseline studies. For details, please visit the conference website https://baltic.earth/EMS2/ and be cordially invited to attend the event and contribute to the discussion. A total of 25 invited lectures will be presented and discussed in three topical cycles in order to generate future scenarios for this century. Modeling should help to work out strategies for balancing the protection of the environment and the economic use of marginal sea resources.

The IAMG is collaborating in symposia 35.1 (Mathematical Geosciences and Mineral Resource Evaluation) and 45.10 (Advances in Global Geological Data Sharing and Processing).

news about coda work: save the date!
the codawork 2021 conference has been postponed to 2022 due to the world pandemic. however the local organizers in toulouse and the scientific committee invite you to participate in an online event (co Dawson) on June 31st 2021. there will be five invited talks, and the conference is free of charge. the detailed program will be announced shortly on the CoDA association website https://www. coda-association.org.

the 36th IGC has been postponed until August 16-21, 2021
the IAMG is collaborating in symposia 35.1 (Mathematical Geosciences and Mineral Resource Evaluation) and 45.10 (Advances in Global Geological Data Sharing and Processing).

EGU 2021 General Assembly
The IAMG is co-organizing the geostatistics session within the EGU 2021 General Assembly.

Online-conference “Marginal Seas – Past and Future”
Dec 16/17, 2020
During the annual conference of the International Association for Mathematical Geosciences “IAMG 2019”, held at State College, Pennsylvania, USA, August 10-16, 2019, an international and interdisciplinary group of scientists launched an initiative “Eurasian Marginal Seas – Past and Future (EMS)”. The initiative’s objective is to develop a generally accessible methodology, based on big data analyses and numerical modeling, to answer questions related to environmental changes in marginal seas during the Last Glacial Cycle in order to generate future scenarios for this century. Modeling should help to work out strategies for balancing the protection of the environment and the economic use of marginal sea resources.

The initiative resulted in an international Marginal Seas network, supported by IAMG and the DDE Big Science Program of the IUGS. However, communication within the network slowed down after the 36th IGC had been postponed due to the pandemic which dramatically hampers face-to-face meetings. Having learned from these lessons, we are continuing our work via electronic communication means. When discussing the possibilities of modeling the processes in marginal seas, we realized that we still have to close gaps in our basic knowledge by conducting baseline studies before - or in parallel - numerical models describing processes in marginal seas can be generally used. The on-line conference organized by the Institute of Marine and Environmental Sciences, University of Szczecin, Poland, together with partners of the Marginal Seas network will serve as a contribution to these baseline studies. For details, please visit the conference website https://baltic.earth/EMS2/ and be cordially invited to attend the event and contribute to the discussion. A total of 25 invited lectures will be presented and discussed in three topical cycles in order to generate future scenarios for this century. Modeling should help to work out strategies for balancing the protection of the environment and the economic use of marginal sea resources.

The IAMG is collaborating in symposia 35.1 (Mathematical Geosciences and Mineral Resource Evaluation) and 45.10 (Advances in Global Geological Data Sharing and Processing).

news about CoDaWork: save the date!
The CoDaWork 2021 conference has been postponed to 2022 due to the world pandemic. However the local organizers in Toulouse and the scientific committee invite you to participate in an online event (CoDaDay) on June 31st 2021. There will be five invited talks, and the conference is free of charge. The detailed program will be announced shortly on the CoDa Association website https://www. coda-association.org.

The 36th IGC has been postponed until August 16-21, 2021
The IAMG is collaborating in symposia 35.1 (Mathematical Geosciences and Mineral Resource Evaluation) and 45.10 (Advances in Global Geological Data Sharing and Processing).
Computers & Geosciences
C&G - Volume 139, May 2020
An improved partitioning method for dissolving long and narrow patches — Chengming Li, Pengda Wu, Yong Yin, Wei Wu
Reliable Euler deconvolution estimates throughout the vertical derivatives of the total-field anomaly — Felipe F. Melo, Valéria C.F. Barbosa
3D rock fabric analysis using microtomography: An introduction to the open-source TomoFab MATLAB code — Benoît Petri, Bjarme S.G. Almqvist, Mattia Pistone
Comparative study of landslide susceptibility modeling with recurrent neural networks — Yi Wang, Zhice Fang, Mao Wang, Ling Peng, Haoyuan Hong
Deep learning-based method for SEM image segmentation and characterization, an example from Duverney shale samples in Western Canada Sedimentary Basin — Zhuming Cao, Xiaojuan Liu, Jijin Yang, Edward Little, Yu Zhu
Mapping Himalayan leucogranites using a hybrid method of metric learning and support vector machine — Ziyu Wang, Renguang Zuo
Coupling OGC WCS and W3C PROV for provenance-aware geoprocessing workflows — Mingda Zhang, Liangcun Jiang, Jing Zhao, Peng Yue, Xueqian Zhang
Integrated multi-scale reservoir data representation and indexing for reservoir data management and characterization— Fangyu Li, Chaoqi Gao, Yanqin Liu, Kailang Huang, Mao Pan, Xi Chen, Yaoli Yuan
A method and software solution for creating clay model description based on the radon transform — G. Moreno Chávez, Jesús Villa, D. Sarocchi, Efren González-Rodríguez, Itziar Sanz
Development of hierarchical terrion workflow based on gridded data — A case study in Denmark — Yannik E. Roell, Yi Peng, Amélie Beucher, Mette B. Greve, Mogens H. Greve
Crosstalk-free simultaneous-source full wave inversion with normalized seismic data — Qingchen Zhang, Weijian Mao, Jinwei Fang
1D geological imaging of the subsurface from geophysical data: Bayesian Evidential Learning — Hadrien Michel, Frédéric Nguyen, Thomas Kremer, Ann Elen, Thomas Herrmans
Numerical stratigraphic forward models as conceptual knowledge repositories and experimental tools: An example using a new enhanced version of CarboCAT — Isabella Mesaros, Estanislao Kozlowski, Geóls Antonatos, Hailwei Xi, Peter Burgess
A comparative study of wavelet-based ANN and classical techniques for geophysical time-series forecasting — Shivam Bhardwaj, E. Olwayeshekar, Priyanka Padyar, Vikram M. Gadre
C&G - Volume 139, June 2020
Integration of convolutional neural network and conventional machine learning classifiers for landside susceptibility mapping — Zhic Fang, Yi Wang, Ling Peng, Haoyuan Hong
Ontology-driven representation of knowledge for geological maps — Alizia Mantovani, Fabrizio Piana, Vincenzo Lombardo
PluvioReader: A software for digitizing weekly siphoning-type pluviograph strip charts — Ana Berta, José Vargas, Claudio I. Meier
atakig: An R package for multivariate area-to-area and area-to-point kriging predictions — Maogui Hu, Yanwei Huang
"sen2r": An R toolbox for automatically analyzing Sentinel-2 satellite data — Luigi Randhetti, Mirco Boschetti, Francesco Nutri, Lorenzo Bussetto
GEMM3D: An Edge Finite Element program for 3D models of electromagnetic fields and sensitivities for geophysical applications — Carlos Mateus Bárria Nunes, Cícero Régo
Content search within large environmental datasets using a convolution neural network — J. Freeman
Compressibility predictions using digital thin-section images of rocks — Vishal Das, Nishank Saxena, S. van der Hofmann
Using wavelet filtering to perform seisnometer azimuth calculation and data correction — Penghui Wang, Yuyana Zhou, Yongqing Lv, Yu Yang
Evaluation of different learning methods for lithology classification using geophysical data — Thiago Santi Bressan, Marcelo Kehl de Souza, Tiago J. Girelli, Fábio Chemale Junior
Article(s) from the Special Issue on Quantitative understanding of natural phenomena in Earth Sciences: concepts and tools for data analysis; Edited by Antonella Bucciantti, Peter Filzmoser and Karel Hron
Application of multivariate geostatistics for local-scale lithological mapping — case study of pelagic surface sediments from the Clarion–Clipperton Fracture Zone, eastern equatorial Pacific (Interoceanmental claim area) — Lukasz Maciag, Jan Harfl
C&G - Volume 140, July 2020
Improving the classification of flood treetools with contextual hydrological information in a multimodal neural network — Jins A. de Bruijn, Hans de Moel, Albrecht H. Weerts, Marco A. Santini, Jeroen C.J.H. Aerts, Hans de Moor, Marieke van der Veen, Attila Haberreiter, Kevin J. Emery
Analyzing continuous infrasound from Stromboli volcano, Italy using unsupervised machine learning — Alex J.C. Witsil, Jeffrey Lewis J. McGibbney, John Burnell, Warwick Kissling, Philippa Farmer
A two-dimensional, higher-order, enthalpy-based thermomechanical flow model for mountain glacier and ice shelf flow experiments — Yuzhe Wang, Tong Zhang, Cunde Xiao, Jiawen Ren, Yanfen Wang
Wawera: A parallel open-source geothermal flow simulator — Adrian Croucher, Michael O’Sullivan, Jonathan O’Sullivan, Yusuf Yeh, John Burnell, Warwick Kissling
Recursive convolutional neural networks in a multiple-point statistics framework — Giovanni Avallone, Cristiana Laussi, Stefano Longo, Maria Grazia Gai, Mario Camara, Patrizio Praz
A hybrid prediction model of landside displacement with risk-averse adaptation — Yin Xing, Jianping Yue, Chuang Chen, Yuluo Qin, Jia Hu
C&G - Volume 142, September 2020
Improving search ranking of geospatial data based on deep neural networks and behavior data — Yun Li, Yongyao Jiang, Chaowei Yang, Man Zhu, Yu, Kara Kamalí, Edward M. Abraham, Thomas Huang, David Moroni, Lewis J. McGibbney
Hybrid geological modeling: Combining machine learning and multiple-point statistics — Tao Bai, Pemjan Tahmasebi
Fast summarizing algorithm for polygonal data — Scott Haag, David Tarboton, Martyn Smith, Ali Shokoufandeh
The SoilExp software: An open-source Geophysical User Interface (GUI) for post-processing spatial and temporal soil surveys — G. Boudoire, M. Liuzzo, S. Cappuzzo, continued on next page
DeepVarveNet: Automatic detection of glacial X-Ray diffraction data and Raman spectra — Best Fit for Complex Peaks (BFCP) in characterization with random forest

Renaut, Saeed Vatankhah

A tutorial and open source software for the Temperatures — L. Speich, S.C. Kohn

active Defects in Diamond and Inferred Residual Forest — Liguo Weng, Ming Qian, using A multi-dimensional multi-grained land use/land cover recognition in arid zone Albuquerque

Direct forecasting of global and spatial model multivariate pore-pressure prediction — Hao Ouyang, Zhilong Zhang, Zhen Liu based on a vertically projected triangulated 3D geological model and cutting algorithm

Guanru Zhang, Peng Lu, datasets from Supcrtbl and extending customized Phreeqc thermodynamic system for multidimensional bio-optical Aquopts: A multisource processing system for the legibility — Yilang Shen, Tinghua Ai, of artificial polygonal water areas considering Obayashi, T. Tsuji, P. K. Kang, T. Ito

A tile-map-based method for the typification of artificial polygonal water areas considering the legibility — Yilang Shen, Tinghua Ai, Jingzhong Li, Lu Wende Li

Aquptos: A multisource processing system for multidimensional bio-optical data integration and correction — Alison Fernando Coelho do Carmo, Milton Hirokazu Shinakawa, Milton Nobuhario Imari, Naraine Marselle Ribeiro Bernardo, Fernanda Sayuri Yoshino Watatanbe, Enner Herênio de Alcântara

SupPhreqc: A program for generating customized Phreeqc thermodynamic datasets from Supcrtbl and extending calculations in data crucial for reservoirs and temperatures — Guanru Zhang, Peng Lu, Yilun Zhang, Kevin Tu, Chen Zhu


Direct forecasting of global and spatial model parameters from digital elevation model (DEM) index, chi gradient of channel and swath profiles from digital elevation model (DEM)

Dune migration and volume change from airborne LIDAR, terrestrial LIDAR and synthetic aperture radar interferometry — Carlos H. Grohmann, Guilherme P.B. Garcia, Alyne Almeida Affonso, Rafael Walter Albuquerque

C&G - Volume 143, October 2020


Applying Geosciences

C&G - Volume 6, June 2020

A tie-point zone group compaction schema for the geolocation data of S-NPP and NOAA-20 VIIRS SDRS to reduce file sizes in memory-sensitive computing environments — Anders Meier Soerensen, Stephan Zinke

Relative landscape maturity in the South Riftian Ridges (NW Morocco): Inferences from DEM-based surface indices analysis — Afaf Amine, Hmidou El Ouardi, Mjahid Zebari, Hassane El Makrini, Mohamed Habibi

Partial correlations in compositional data analysis — Ionas Erb

Investigating the influence of environmental factors on the incidence of renal disease with compositional data analysis using balances — Jennifer M. McNulty, Ute Mueller, Peter M. Atkinson, Ulrich Offerding, Chloe Jackson, Siobhan F. Cox, Rory Doherty, Damian Fogarty, J.J. Egozcue, V. Chenoubi Wang

C&G - Volume 7, September 2020

Enabling student self-guided field expeditions in geoscience with the GeoXploration platform for mobile apps — Kelley B. Lazar, Stephen M. Mofsey

Comparative analysis of different vegetation indices with respect to atmospheric particulate pollution using sentinel data — Shivangi S. Somvanshi, Maya Kumari

MATLAB functions for extracting hypsometry, streamflow and soil water balance indices and other spatial data for landscape characterization — Pedro N. J. Siauwara, Sravan Kumar Kotluri, Prabha Pandey, Anand Kande


A synthetic case study of measuring the misfit between 4D seismic data and numerical reservoir simulation models through the Moment Tensor for the Southern Vargas, Klaus Rollmann, Forian Almeida, Alessandra Davolato, Bernd Hamann, Denis J. Singler, Anderson Rojas-Marin, Fernando A. Rochinha, Alvaro L.G.A. Coutinho

A new structure for representing and tracking version information in a deep time knowledge graph — Xiaogang Ma, Chao Ma, Babak Vaheddoost, Babak Mohammadi

The interactions between multiple arbitrarily oriented inhomogeneities with thermo-poroueous eigenstrains and its applications in geothermal resources — Xiangzhe Zhang, Ph. J. Ding Lu, Xiaoqing Jin, Peter K. Liaw, Leon M. Keer

C&G - Volume 144, November 2020

Land use/land cover recognition in arid zone using A multi-dimensional multi-grained residual Forest — Liguo Weng, Ming Qian, Min Xia, Yiqing Xu, Chunzheng Li, Rosemary Anne, Renaut, Saeed Vatankhah

A tutorial and open source software for the efficient evaluation of gravity and magnetic kernels — Cui Qiu, Longguo Wang, Zhiding Cui, Jing Li

AnisEulerSC: A MATLAB program combined with MTF and Euler's elastoplastic model for the quantified uncertainty — Carlos H. Grohmann, Guilherme P.B. Garcia, Alyne Almeida Affonso, Rafael Walter Albuquerque

SeisElastic2D: An open-source package for simulating 2D dynamic elastic wave propagation in the misfit between 4D seismic data and 3D X-ray computed tomographic imaging — Seong Jun Ha, Yeong Joon Jeong, Taek Sup Yoo

Developing comprehensive geocomputation tools for landslide susceptibility mapping: LSM tool pack — Emrehan Kutlug Sahin, Tolga Kose, A. Ercan Acmacl, Aykut Akgun, Arif Cagdas Aydinoglu

Web-based machine learning tool that determines the origin of natural gases — John E. Snodgrass, Alexei V. Milkov

Division of crustal units in Crust using grid-based clustering and a zircon U–Pb geochronology database — Xianjun Fang, Yuying Wu, Sijia Liao, Lizhe Xue, Zhe Chen, Jian Liu, Zhan Xu, Yun Ling, Shengyi Hu, Shuyong Kong, Yiwei Xiong, Huacheng Li, Xiuxi Shang, Rui Ji, Xueyun Lu, Biao Song, Lei Ji

Multimodal imaging and machine learning to enhance microscopes images of shale — Timothy I. Anderson, Bolivia Vega, Anthony R. Kovscek


Automatic detection of ionospheric Alfven Resonances from VLF data using Un-net — Paolo Marangio, Vyron Christodoulou, Rosa Filgueira, Hannah F. Rogers, Clarán D. Beggan

A statistical analysis of lossy compressed 3D seismic data: Waveform recovery from 4D seismic data — Eunyoung Kim, Hyun Min Cho, Chunan Du, Jinwu Ouyang, Zhihong Zhan, Zhen Liu

A machine learning methodology for multivariate pore-pressure prediction — Hao Yu, Guoxiong Chen, Hanming Gu

Direct forecasting of global and spatial model parameters from digital elevation data — Jihoon Park, Jef Caers

Dune migration and volume change from airborne LIDAR, terrestrial LIDAR and synthetic aperture radar interferometry — Carlos H. Grohmann, Guilherme P.B. Garcia, Alyne Almeida Affonso, Rafael Walter Albuquerque

CG continued from p. 10

G. Giuffrida, P. Cosenza, A. Derrnien, E.E. Falace

Direct transformation from Cartesian into geodetic coordinates on a triaxial ellipsoid — Gema Maria Diaz–Toza, Leandro Marin, Ioana Nedelcu


A fast and accurate bundle adjustment method for very large-scale data — Maoteng Zheng, Fanyong Zhang, Junfeng Zhu, Zejun Zhu

A 3D sketch-based formulation to model salt bodies from seismic data — Suellen Motta, Anselmo Montenegro, Marcelo Gattass, Deane Roehl

Spatial prediction of oil and gas distribution using Tree Assisted Bayesian Stereo — Hong-Jia Ren, Xian-Chang Wang, Qu-Lin Guo, Xiao-Xin Guo, Rui Zhiang