Rui Jin

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EDUCATION

Ph.D.: Department of Earth and Planetary Sciences, Johns Hopkins University   2018 - 2023

Dissertation: Constructing more realistic models of biogeochemical processes: Key considerations for the cryptic sulfur cycle, optics and beyond

Advisor: Anand Gnanadesikan

M.E.: College of Geosciences, China University of Petroleum   2015 - 2018

Thesis: Sedimentation evolution simulation of Baikouquan formation in Triassic in Mahu sag of Junggar Basin

Advisor: Linhao Fang

B.E.: College of Geosciences, China University of Petroleum   2011 - 2015

PUBLICATIONS

Peer-reviewed Journal Publications

[1] **Jin, R.**, Pradal, M.A., Hantsoo, K., Gnanadesikan, A., St-Laurent, P. and Bjerrum, C.J., 2023. Comparing two ocean biogeochemical models of Chesapeake Bay with and without the sulfur cycle instead highlights the importance of particle sinking, burial, organic matter, nitrification and light attenuation. Ocean Modelling, 182, p.102175.

[2] **Jin, R**., Pradal, M.A., Hantsoo, K., Gnanadesikan, A., St-Laurent, P. and Bjerrum, C.J., 2023. (accepted at MethodsX) Constructing a model including the cryptic sulfur cycle in Chesapeake Bay requires judicious choices for key processes and parameters.

[3] Preheim, S.P., Morris, S., Zhang, Y., Holder, C., Arora-Williams, K. K., Gensbigler, P., Hinton, A., **Jin, R**., Pradal, M.A. and Gnanadesikan, A., 2023. (in rev for Limnology and Oceanography) Major trends and environmental correlates of spatiotemporal shifts in the distribution of genes compared to a biogeochemical model simulation in the Chesapeake Bay.

Manuscripts in Preparation

[1] **Jin, R**., Gnanadesikan, A., Pradal, M.A., St-Laurent, P. and Friedrichs, M. A. The role of colored dissolved organic matter (CDOM) in coastal ocean hypoxia.

[2] **Jin, R**. and Gnanadesikan, A. Distributional characteristic and driver sensitivity study of global particulate inorganic carbon versus particulate organic carbon.

RESEARCH EXPERIENCES

Oct 2022 – present: Studying role of Colored Dissolved Organic Matter (CDOM) in coastal ocean hypoxia

– Used a modified aborption equation to study the effect of CDOM on hypoxia in Chesapeake Bay.

– Investigated the dynamics of nutrients, detritus, and burial across the two simulation scenarios to elucidate the factors that contribute to changes in hypoxia intensity and distribution resulting from removal of CDOM.

Oct 2022 – present: Distributional characteristic and driver sensitivity study of global particulate inorganic carbon versus particulate organic carbon

– Used machine learning method to study how sensitivities to a range of environmental drivers differ for two carbon species in observations and outputs of ESMs and investigated whether ESMs correctly capture physiological mechanisms on different types of phytoplankton.

May 2020 – Apr 2022: Constructing an ideal model including the cryptic sulfur cycle in Chesapeake Bay

– Incorporated a biogeochemical model with coupling between sulfur and nitrogen developed for Peru Upwelling into a nitrogen-based model for Chesapeake Bay.

– Highlighted the importance of particle sinking, burial, organic matter, nitrification and light attenuation by conducting sensitivity studies on a newly proposed baseline model.

Oct 2016 – Jun 2018: Sedimentation evolution simulation of Baikouquan formation in Triassic in Mahu sag of Junggar Basin

– Established the initial sedimentary evolution model with Dionisos, a three-dimensional numerical stratigraphic forward modeling software program.

– Optimized the model of the sedimentary evolution of Baikouquan formation from 250 to 244 Ma using geological data and analyzed the sedimentary environment and facies distribution based on the predicted model.

Sep 2013 – Jun 2015: Optimization of drilling collar's wall thickness of quadrupole acoustic logging tool under certain geological backgrounds

– Studied the characteristics of quadrupole acoustic source under certain geological backgrounds.

– Ran a MATLAB model to optimize drilling collar's wall thickness under certain geological backgrounds.

HONORS & AWARDS

2019   E&PS Summer Field Research Fund, Johns Hopkins University

2018   Earth and Planetary Science Fellowship, Johns Hopkins University

2018   Distinguished Master's Thesis Award, China University of Petroleum

2017   Outstanding Graduate Student Award, China University of Petroleum

2016   First-class Scholarship for Elite Students, China University of Petroleum

2014   Honorable Mention for Mathematical Contest in Modeling

2013   Outstanding Student in Academics, China University of Petroleum

2013   Third prize for coding competition, China University of Petroleum

2013   Second prize for Chinese Undergraduate Mathematical Contest in Modeling

2012   Science and technology scholarship, China University of Petroleum

2011   Honorable Mention for Geological Modeling Contest, China University of Petroleum

PRESENTATIONS

2022   AGU Fall Meeting in Chicago, Illinois, 2022: The Delivery of Colored Dissolved Organic Matter (CDOM) May Affect the Distribution and Intensitiy of Hypoxia in Coastal Oceans. Poster presentation

2022   Chesapeake Community Research Symposium in Annapolis, Maryland, 2022: Translating an Open-Ocean Biogeochemistry Code with Cryptic Sulfur Cycling to Chesapeake Bay Requires Considering the Impacts of Burial, Dissolved Organic Matter and Optics. Oral Presentation

2022   Ocean Sciences Meeting online, 2022: Comparing Two Biogeochemical Models in Chesapeake Bay - Distinguishing the Roles of Common Parameters from Differences in Nutrient Cycling Pathways. Oral Presentation

TEACHING EXPERIENCE

Spring 2023   Guest lecturer, Johns Hopkins University

AS.271.107 Introduction to Sustainability (Sustainability in Chesapeake Bay) (1 lecture)

Spring 2023   Graduate Teaching Assistant, Johns Hopkins University

AS.271.107 Introduction to Sustainability

PROFESSIONAL MEMBERSHIPS

2022 – Present   American Geophysical Union

COMPUTATIONAL SKILLS

Coastal ocean model: ROMS

Machine learning

Advanced courses in Mathematics (especially Information and Computing Science)

Programming: C++, Fortran, Bash, Python, R

Parallel Programming: MPI, OpenMP

HPC batch schedulers: SLURM

Software: ArcGIS, Dionisos, MATLAB

REFERENCES

Anand Gnanadesikan
Professor and Chair, Morton K. Blaustein Department of Earth and Planetary Sciences
Johns Hopkins University
gnanades@jhu.edu

Pierre St-Laurent
Senior Research Scientist, Virginia Institute of Marine Science (VIMS)
pst-laurent@vims.edu

Sarah Preheim
Associate Professor, Department of Environmental Health and Engineering
Johns Hopkins University
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