

Editorial

Nitrogen: A New Cross-Disciplinary International Open Access Journal

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Nitrogen, the element that is intimately associated with essentially all processes on Earth, is the broad focus of a new online, open access journal. The intention of this publication is to offer a venue for research papers, reviews, short notes, and communications that have as a nexus this critical element. Additional special issues will involve topics that will include a variety of papers addressing the state of knowledge in a particular topic involving nitrogen and the nitrogen cycle. These topics include nitrogen fixation, both biological and abiotic; nitrogen pollution; reactive nitrogen, in the atmosphere and hydrosphere; the increasing human nitrogen footprint on the planet; the identification of nitrogen compounds in the marine environment; and the preservation of organic nitrogen in sediments, soils, and fossils.

Nitrogen is an essential nutrient to all life, and in many situations its abundance places limits on total productivity and, as a result, on life itself. A century ago, there was great concern that the amount of nitrogen available for supporting agricultural practices was limited. While nitrogen is the most abundant element in the atmosphere, its form, as molecular dinitrogen, makes it essentially unusable for life except in the case of a few species of microbial organisms. Owing to the invention of the Haber Bosch process early in the last century, humans now “fix” more nitrogen than what is accomplished in nature. This process consists in breaking the triple bond between two atoms of nitrogen and turning them into “usable” nitrogen for plants as ammonium. This modification of the nitrogen cycle affords an excess of nitrogen that is now released into rivers and the coastal ocean, causing eutrophication and influencing the creation of ever-growing regions ominously identified as “dead zones” that are the size of the nation of Israel.

The Anthropocene has seen the influence of humans modifying the environment and the balance of the nitrogen cycle. Environmental modifications and perturbations may influence the natural processes of the capture of atmospheric nitrogen or that which is dissolved in fresh and marine waters, and the associated feedbacks to balancing the cycle’s reservoirs and pathways including nitrification, nitrate reduction, and denitrification. Clearly, the impact of rising temperatures with climate change or the heightening of the acidity of the oceans is only beginning to be addressed. The ecosystem that depends on processes that developed over billions of years may be threatened. We see this journal as an opportunity for research that is cross-disciplinary to have a wide audience for the presentation of these important discoveries.

This journal also offers an opportunity for presentation of novel tools and technologies for the identification and quantification of reservoirs, residence times, and pathways of nitrogenous materials in the nitrogen cycle. Such a tool includes stable isotope analysis. Nitrogen has two stable isotopes, ^{15}N and ^{14}N , with approximate abundances of 0.36% and 99.64%, respectively. High precision measurements at the natural abundance level by mass spectrometry or by using tracer levels of the heavier isotope now allow for a clear resolution of pathways and rates of incorporation. Quantifying the impact of human modification of the nitrogen cycle at regional and global scales is now possible. Even at the molecular level, a developing powerful tool is being established with

compound specific ^{15}N of individual amino acids to trace the flow of essential components through food chains. Preservation of ancient signals for plant types in past environments can be seen in the isotope composition of chlorophyll molecules.

The editorial board of this new journal, *Nitrogen*, is excited about the unique nature of this publication. It is a cross-disciplinary open access journal that will offer researchers a venue through which their own findings and perspectives can be rapidly reported to a wider, global audience, with little limitation on length. At the same time, since the publication is open access, the readership of the “nitrogen community” will be exposed to novel approaches and discoveries that will influence their own ideas and interpretations. The large number of disciplines represented by the editorial board of *Nitrogen* guarantees individualized, careful, and rigorous peer review. With over two decades of experience in publication, the editorial staff of MDPI has a well-established record in quality of the science published. The journals of the MDPI family are included in Scopus and the Science Citation Index. Through MDPI, publications are archived in the Swiss National Library. This new journal, *Nitrogen*, will, most importantly, be an opportunity for intensely interactive topics that involve innovative and pioneering science, which will be available to the global community now and in the future. As Editor-in-Chief of the editorial board, I invite you to submit your manuscripts, offer suggestions, participate in the review process, or lead a topic of special interest. I look forward to your comments and manuscripts.



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