
Earth Day and the Earth Sciences

Connecting Geology and Sustainability

Phoebe McMellon, GeoScienceWorld CEO
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For well over a year, the world's attention has been focused on the COVID-19 pandemic, a crisis unlike anything we have ever experienced. However, on this Earth Day, we are reminded of the longstanding environmental and climate issues that threaten our future. Earth Day inspires us to think about the impact of our actions and come up with innovative solutions that champion both the sustainable development of resources as well as the protection of the environment. We are at once looking to conserve our precious resources and to create renewable ones for the future.

Opportunity for innovation

Though our environmental challenges are daunting, they offer incredible opportunities. It is often when faced with intractable problems that scientists and engineers find new ways to break ground and improve lives. We have seen a dramatic example of this in the past year with the rapid development of multiple COVID-19 vaccines. And we should expect the same from the scientists and researchers that are undertaking the meticulous work that will deliver cleaner air, hardier crops, and sustainable products and processes. At GeoScienceWorld, we know both basic research and applied research are important drivers of innovation and scientific advancement.

“After spending a trimester studying earth processes and the record of volcanic eruptions, asteroid impacts, ocean openings and closings, glacial epochs, extinctions, and other highlights of earth history, one of my wise students commented that she was no longer worried about whether or not humans would destroy the earth, because the earth had already been around for 4.5 billion years and it surely would survive humans.”

The real question is whether or not HUMANS will survive unsustainable human practices.” - Mary Savina, Carleton College

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A geoscientist’s understanding and knowledge of the earth and its complex processes, runs deep, extends over vast periods of time, through multiple mass extinctions, and catastrophic events. This knowledge can easily be leveraged and applied to ensure that we are smarter, wiser, and more informed stewards of the earth. And yet, geologists have been underrepresented in sustainability science. Germán Mora, a professor in the Environmental Studies Program at Goucher College, once lamented this fact in an article in [GSA Today](#). He noted that geologists possess expertise that could be very useful in this area, such as experience examining phenomena at different temporal and spatial scales, comfort with integrating concepts from multiple disciplines, and the ability to find patterns in complex systems.

Meaningfully connecting geology and sustainability sciences will be an important next step for geoscience educational programs for the next generation of geoscientists, just as connecting geology and environmental sciences was in the mid-1990s, and continues today. Sustainable geoscience must become a more integral part of the curriculum, so that geology students are primed to start thinking about how they can use their knowledge of the earth to tackle our environmental problems and seek out solutions in a variety of important areas, such as natural resource extraction and post-extraction remediation, geothermal and non-renewable resource development, water security (quality and quantity), disaster management and risk reduction, land management protection, development, and remediation, and even urban development. Geologists are accustomed to considering the earth in an historical context, but should also be encouraged to imagine its future.

Sustainable Development Goals (SDGs)

In his paper “Geology and the Sustainable Development Goals,” Joel C. Gill of the British Geological Survey argued that geologists have a role to play in achieving the SDGs and outlined practical examples, such as how the ability to identify groundwater resources can contribute to providing access to clean water, and the use of local rock and mineral materials to improve soil fertility can help ensure food security. “Their knowledge of the Earth’s structure, the materials it is made of, and the processes by which it is constantly being shaped can be used to inform many important areas of sustainable development,” wrote Gill.

This [NREL study](#) found that using solar and wind power to generate 35% of the electricity in the western U.S. would reduce fuel costs by 40% and carbon emissions by 25%–45%. That is a powerful argument for the importance of embracing these renewable sources of energy, and geologists – with their comprehensive knowledge of the earth and its elements – undoubtedly have much to contribute to these efforts. Geologists and geoscientists can also provide valuable information that helps us to realize the limits of our natural resources and how to better manage them. In addition, as we gain a better understanding of the impact and limitations of the earth’s resources, any transition or acceleration to renewables will still be dependent on non-renewable ones in the form of lithium, cobalt, copper, graphite, and nickel, to name a few – and geologists will play a critical role in helping to find and to manage the extraction and use of these resources in the future.

It is going to take a village to address the multi-faceted issues around climate, the environment and natural resource management that we are facing now. Researchers across STEM will need to work together to advance our understanding of the earth’s process, to identify new resources and develop technologies to use, reuse and recycle materials.

[Digging into the Research](#)

Celebrate Earth Day by exploring select articles, abstracts, conference proceedings, published in the last 5 years, that are available on the GeoScienceWorld platform and demonstrate the vast research topics and geologic disciplines within the broader field of geology and sustainability. Our publishers have made the following content free to access until Wednesday, April 28 at midnight EDT.

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