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# Why geology must abandon fossil fuels and embrace sustainability

Geologist have often served fossil fuel exploration – now is the time for them to focus on climate change and other sustainable development goals instead, says **Christopher Jackson**

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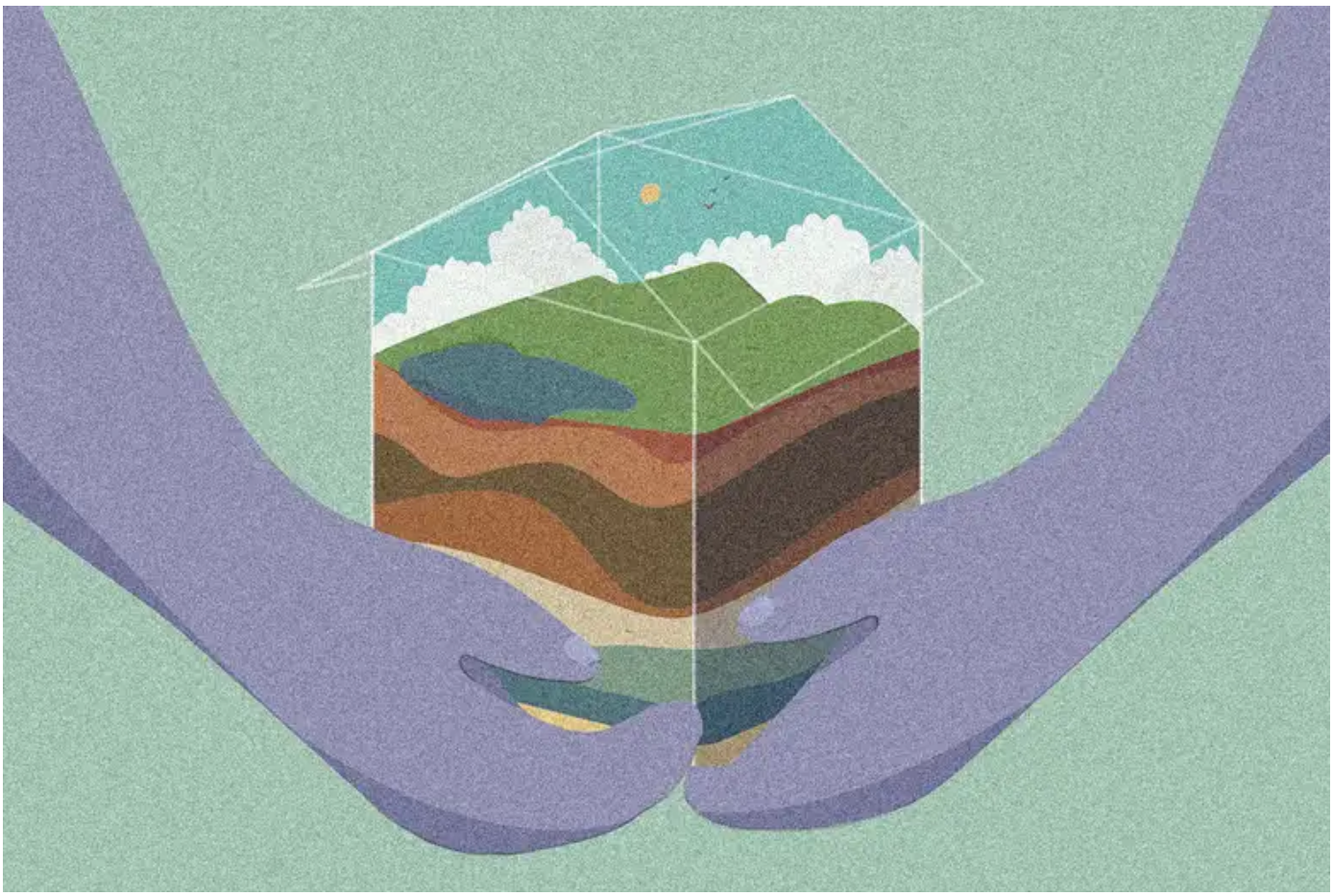
By **Christopher Jackson**



Michelle D'urbano

THIS year has brought into sharp focus the importance of scientists in our everyday lives. Vaccinologists have sought to create inoculations to help tackle the covid-19 pandemic, and have succeeded. Virologists, epidemiologists and behavioural scientists have directly informed government policies that control our movements to keep us safer.

Pandemics come and (we hope) go. But what of global warming? Overshadowed in 2020, this threat to the environment, global health and our economic well-being will persist for generations after covid-19. Scientists clearly have a pivotal role in understanding and, ultimately, informing policies that aim to mitigate its impacts – none more so than geologists.

It is a common misconception that geology is "just" about rocks. True, geologists are trained to read what rocks tell us about Earth's past, present and possible future structure and evolution. But, as I will explain as part of this year's Royal Institution Christmas Lectures, geological processes and climate are inextricably linked.



Numerous complex physical and chemical links and feedbacks exist between Earth's surface and subsurface rocks, its atmosphere, oceans and ice caps and life in all these places. Volcanic eruptions bring carbon from deep within the planet to the surface and the air, enhancing the greenhouse effect. Conversely, weathering of exposed rocks at the surface and the action of shell-forming animals in the oceans remove carbon dioxide from the atmosphere, reducing global warming.

The rocks and fossils in the geological record bear witness to these processes, showing us that Earth's climate has changed continually since the planet formed around 4.6 billion years ago. This same record also shows that atmospheric $CO_2$ is at its highest level in at least the past 3 million years, and that the current pace of planetary warming is unprecedented in Earth's history.

The geological record can also be used to assess the accuracy of complex numerical models used to predict future climate and its impact on Earth's habitability. Geology has improved our understanding of global warming and hopefully will help us to mitigate it.

There is an irony to that, given geologists' work also underpins the locating and exploitation of climate-heating fossil fuels. Now, more than ever, our discipline needs to fully embrace the concept of "sustainable geoscience".

This isn't a new idea and nor is it limited to climate change. The many and varied historical contributions of geology to tackling some of our greatest societal challenges can be seen by looking at the United Nations Sustainable Development Goals. To name just a couple of examples, geologists study the origin, natural transportation and fate of contaminants like arsenic and lead, critical to the provision of safe and reliable water supplies, and they explore the origin of natural hazards such as landslides and earthquakes, and so help reduce the vulnerability of communities across the world.

But geologists must redouble their engagement with other scientists and politicians to develop and ultimately help implement solutions to the many environmental and resource challenges we face. Students of geology should be made aware of the broader contributions their multidisciplinary skill set can make to global well-being, beyond just energy provision

– although ensuring energy supply, we should not forget, underpins many of the Sustainable Development Goals.

Geology is about far more than just rocks. By collectively reimagining geology through the prism of sustainability, we can ensure that it is central to the public's consciousness, as virology and epidemiology were in 2020.

***Christopher Jackson**'s Royal Institution Christmas Lecture will be broadcast on BBC4 on 28 December in the UK and subsequently on BBC iPlayer*

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