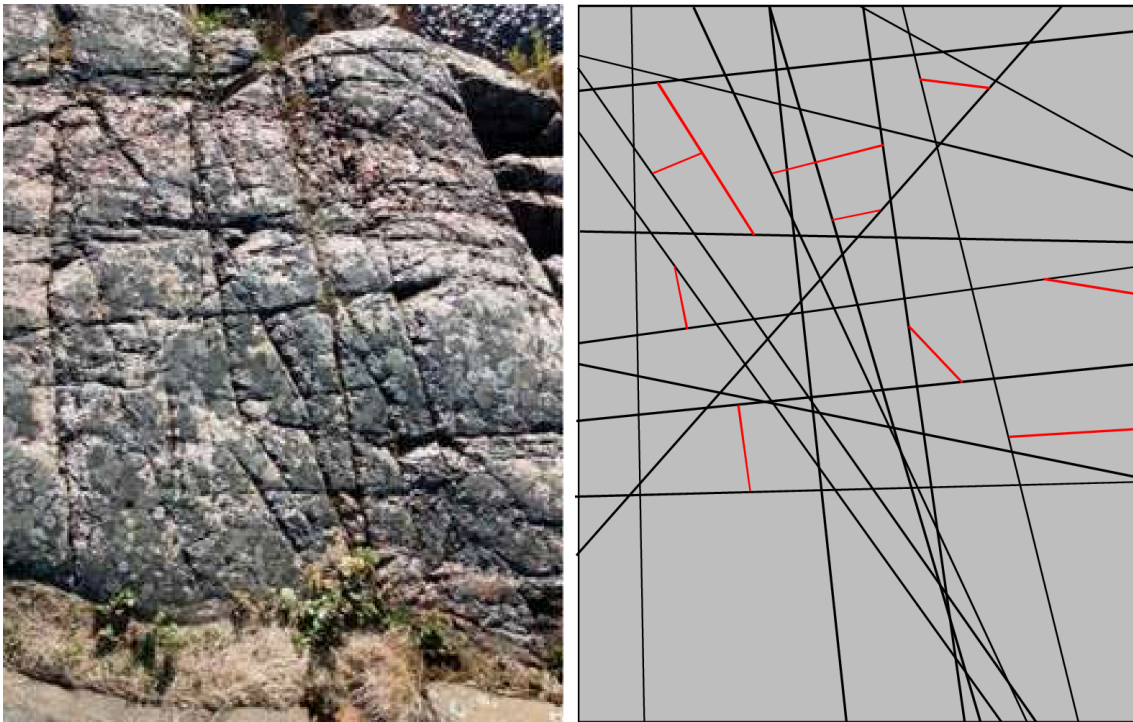




# How do stones break: is the Earth made of cubes, and are we living in a Minecraft world?

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We live on and among the by-products of fragmentation, from nanoparticles to rock falls to glaciers to continents. Understanding and taming fragmentation is central to assessing natural hazards and extracting resources, and even for landing probes safely on other planetary bodies. In this study, we draw inspiration from an unlikely and ancient source: Plato, who proposed that the element Earth is made of cubes because they may be tightly packed together. We demonstrate that this idea is essentially correct: Appropriately averaged properties of most natural 3D fragments reproduce the topological cube. We use mechanical and geometric models to explain the ubiquity of Plato's cube in fragmentation and to uniquely map distinct fragment patterns to their formative stress conditions.