The science of 'superbolts,' the world's strongest lightning strikesaa

They're 1,000 times stronger and brighter than average lightning, and scientists have finally found a cause of these dramatic flashes of electricity.

A lightning bolt strikes the sea near Fort St Elmo during a storm in Valletta, Malta, on February 27, 2019. The highest concentration of superbolts have been observed in the Mediterranean Sea, the North Atlantic, and the Altiplano in Peru and Bolivia—regions where storms' charging zonesare closer to the Earth's surface.

Lightning's rattling cracks and surges of illuminated energy have long prompted puzzling scientific queries. And while many questions about these powerful flashes remain, a particularly significant mystery—how the planets' brightest and strongest strikes occur—was recently answered.

The average lightning strike produces roughly 1,000 to 5,000 megajoules of energy—enough to power a 60-watt light bulb for over six months. The term "superbolt" was coined in a seminal study published in 1977 for flashes that pierced the sky with 1,000 times more light and energy thanthat. While these bolts make up only a tiny fraction of all lightning strikes, their extreme nature can help scientists probe the workings of electrical storms.