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Was the Nepal disaster caused by a Coulomb explosion?

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Perspective

Keywords: landslide, Coulomb explosion, Nepal, glacier

Posted Date: November 4th, 2026

DOI: https://doi.org/10.21203/rs.3.rs-11028802/v1

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Additional Declarations: No competing interests reported.

Abstract

On August 26, 2006, a huge mass of rock and glacier broke off from the parent body at an altitude of approximately 5,200 metres and collapsed 1,200 metres downward. The resulting mudflow destroyed roads and bridges and flooded downstream coastal settlements along the Lende-Khola and Trishuli-Khola rivers, covering almost 100 km. Members of the intergovernmental organization "International Centre for Integrated Mountain Development" (ICIMOD), based in Kathmandu, concluded that the cause of the powerful mudflow was an avalanche of ice and rocks, not a breakout of water from a glacial lake. USGS staff reported that at the point with coordinates 28.271° N, 85.515° E, 55 km NW of Kodarì, Nepal, a glacier collapse occurred, triggering an M5.2 earthquake and a powerful avalanche. At present (September 4, 2026), the actual cause of the disaster is unknown, but judging by similar catastrophic landslides that occurred in the past, as well as the scale of the material involved and the energy of this seismic event, it can be assumed that the cause of the landslide was a Coulomb explosion in the rock massif that served as the underlying layer for the glacier located on it. This article reveals the possible mechanism of the Coulomb explosion in the rocks and the cause of the landslide.

Introduction

Essentially, mountain landslides, rock bursts, and sudden rock ejections are seismic phenomena similar to earthquakes, but on a much smaller scale—both in the energy released and the environmental impact. Nevertheless, landslides, rock bursts, and sudden rock ejections often lead to catastrophic consequences with large numbers of human casualties, which is exactly what happened a week ago in Nepal. An avalanche triggered the event, descending from the Langtang-Lirung and Tsangbu-Ri mountain peaks. The landslide was recorded as a seismic event with a magnitude of 5.2. The subsequent mudflow and flood were accompanied by the ejection of a large amount of sediment and had a huge geographical scale. In Galchi, 88 km downstream from the landslide site, the water level in the Trishuli rose by 9 metres in less than an hour after the avalanche. According to preliminary estimates, the avalanche displaced between 200 and 500 million cubic metres of ice and rock. According to initial reports, the M 5.2 earthquake recorded by the USGS near the border between Nepal and China could have been caused by a tectonic earthquake and could have triggered a landslide. However, subsequent analysis by USGS researchers showed that the seismic signal was caused by a landslide, as the earthquake focus was located on the surface of the mountain range, not in its depths. This point, noted by the USGS, is particularly important for our analysis, because if it wasn't an earthquake with a focus located on the surface or at a shallow depth, then what was it? Again, USGS experts claim that the seismic signal was caused by a landslide, which is rather doubtful, as earthquakes caused by rock collapses typically have a low magnitude, usually not exceeding 3.5, and rarely reach M4.5 even in the case of massive collapses. For example, during the Mayunmarca landslide [1], which occurred on April 25, 1974, in the Huancavelica region of Peru, an earthquake with a magnitude of M4.5 was recorded. However, in terms of the amount of material displaced, the Mayunmarca landslide was more than three times larger than the landslide in Nepal (1.5 billion tonnes versus 0.5 billion tonnes). At the same time, the vertical elevation difference of the Mayunmarca landslide was 1,900 m, while that of the landslide in Nepal was only 1,200 m.

Consequently, the landslide near the mountain peaks Langtang-Lirung and Tsangbu-Ri definitely did not have the physical capacity to generate a seismic shock with a magnitude of M5.2. The question arises: where did the energy for its creation come from? We are going to answer this question, as our answer will allow us to discuss with researchers a new approach to explaining the mechanism behind the occurrence of catastrophic landslides—through Coulomb explosion of rock masses. There are other versions of the tragedy that occurred, but according to world-renowned organizations, the main cause is considered to be the melting of ice and frozen deposits of soil and rock. As you can see, we have serious grounds to doubt this interpretation of the causes of the avalanche, and we propose our own version of this event. For our hypothesis, it is particularly important to note another significant advantage: satellite images taken by Planet Labs [2] show that most of the collapsed region consisted of bedrock with a small amount of glacier. This allows us to conclude that the main culprit behind the incident is not the glacier, but the rocks beneath it, and the reasons that prompted Mount Langtang-Lirung to shed its “excess load” should be sought precisely in the rocks of the mountain range.

Theoretical part

It is known that, depending on the type of atomic particles located at the nodes of crystal lattices and the nature of the bond between the particles, there are four types of lattices: ionic, atomic, molecular, and metallic. It is known that rocks of the Earth's crust contain almost no pure substances; that is, rocks are composites of many elements, which means that any rock may contain an ensemble of all four types of crystal lattices, arranged randomly throughout the volume of the rock in the form of geological inclusions of various volumes and shapes. It is known that a crystal lattice can explode due to the destruction of bonds between atomic particles in accordance with the Coulomb explosion mechanism, which consists in the fact that Coulomb repulsive forces exist between atomic particles located at the nodes of the crystal lattice; these forces are compensated by the electrons located within the lattice volume, as a result of which the entire system is in equilibrium. It is known that if part of the electrons is removed from the lattice volume, Coulomb destruction of the bonds between particles occurs, and crystal lattices instantly explode with the release of energy. It is known that the Coulomb explosion process takes ≥ 10^{-9} seconds. Let us consider classic examples of Coulomb explosions described in the scientific literature. Chemical Coulomb explosion. Until recently, the scientific community knew and firmly believed that the classic explosion of sodium in water occurs due to its active reaction with water, during which a large amount of heat and molecular hydrogen is released: $2Na + 2H_2O = 2NaOH + H_2\uparrow$, which leads to the formation and explosion of a flammable gas: $2H_2 + O_2 = 2H_2O$. And then, suddenly, in 2015, Czech scientists discovered that this is absolutely not the case, and people have been mistaken for more than two hundred years. As scientists demonstrated in their experiments [3], recorded using a high-speed camera, when sodium is immersed in water, electrons immediately escape from the metal’s surface. As a result, a deficit of electrons arises in the sodium crystal lattice. Consequently, the Coulomb repulsive forces between the ions located at the nodes of the crystal lattices begin to dominate, leading to the destruction and dispersal of the lattice’s “skeleton,” with the release of explosive energy. A mechanical Coulomb explosion. In this type of Coulomb explosion, the atom ion nodes of the crystal

lattice are bound by free electrons that move within it in a disorderly manner, resembling the movement of an electron gas. Reference [4] shows that if free electrons are “distracted” from their role as a “glue” by increasing the energy of the electron flow, this will lead to the ejection of electrons from the crystal lattice and its immediate explosion. The energy of the electron flow can be increased in several ways: 1. Due to the inertial forces of the electrons. A vivid example of such a case is the sudden deceleration of a modern high-speed projectile when it hits the tank’s armour, and the emergence at that moment of the inertial force acting on electrons, which, like any physical bodies with mass, continue to move by inertia and, due to the forces that arise, escape from the crystal lattice. A Coulomb explosion of the projectile occurs, the energy of which burns through the tank’s armour. The fact that the inertial process of the Coulomb explosion is real was demonstrated by the famous experiment with a coil of copper wire conducted by American scientists Tolman and Stewart (Tolman R. C., Stewart T. D.) back in 1916. 2. Due to forces of an electromagnetic nature, when a high-density electric current is passed through a substance or it is irradiated with a high-energy laser beam. It is known that the current density is proportional to the electron flow velocity, and the kinetic energy is proportional to the square of the velocity $E = m \cdot v^2/2$. Consequently, if the current density is increased a thousandfold, the kinetic energy of the electron flow will increase a millionfold, and the electrons will collectively leave the crystal lattice, which will naturally lead to a Coulomb explosion. At present, there are several patents for the “Method of exploding solid metal using electrical force,” for example, RU2145147C1 [5].

The mechanism of rock ejection from the massif

During the formation of an elementary rock massif, metamorphic transformations occur as a result of exposure to high temperatures, pressure, an aggressive environment, and stresses arising from the movement of rock blocks. Over time, rock masses not only change their geological, geometric, and chemical form and structure but also their energy parameters. According to the quantum model of the Bohr atom, if the energy imparted to an electron exceeds the critical potential, the electron moves to a higher level. If the incoming energy does not exceed the first critical potential, the array can remain in this metastable state for an indefinite period (millions of years). Over the years, at a random point in time, as a result of the combination of various natural factors — summer–winter–summer and, accordingly, water–ice–water — an alternating pulsation of the stresses and elastic deformations of the rock block occurs. This leads to the release of geostatic stresses and the weakening of the forces of mutual adhesion, resulting in the formation of a release zone. This zone is characterized by decompaction, the emergence and development of lateral resistance cracks, which continuously and inexorably increase in size, and at some point in time the rock block loses its equilibrium state. According to the Second Law of Thermodynamics, this leads to the appearance of electric charges in the rock mass and, as a consequence, to the emergence of an electromagnetic field, the appearance of excited atoms and molecules, the speed of which increases instantly, which leads to a hyperbolic number of collisions between them. In this process, it is particularly important that during inelastic collisions of the second kind, electrons do not emit quanta; on the contrary, energy is transferred from excited atoms and molecules to electrons. In the resulting electromagnetic field, H2O molecules create a

hydration shell around the ions of the crystal lattice, which shields the ions from charges of the opposite sign. And since water has a high dielectric constant (~ 80, depending on the temperature), the electrostatic attraction between ions and electrons will accordingly decrease by approximately 80 times, which will effectively promote the development of the Coulomb explosion process Fig. 1.

It should be noted that many rocks of the lithosphere contain hydroxide mineral impurities containing hydrated water: [(SiO_2, Al_2O_3, TiO_2, Fe_2O_3, CaO, MgO, K_2O, Na_2O) • nH_2O (hydrated water)]. For example, the mineral component of limonite marble — Fe_2O_3 • nH_2O — is also a mineral component of coal and many other rocks. Due to the leading role of the dielectric constant in rock burst processes, it is worth noting the class of so-called ferroelectrics, which can also be part of rock formations — for example, the tetrahydrate of the double sodium potassium salt $KNaC4H4O_6$•$4H_2O$, whose dielectric constant is much higher than that of water and amounts to ~ 500. Let us consider a well-known and well documented case of a sudden rock burst.

The Usoi collapse that occurred in the Pamir Mountains on 02/18/1911 Fig. 2 can be considered a sudden release of rocks because a block of rock with a volume of ~ 1.5 km^3, after detachment from the mother body, did not just slide down the slope, but flew along an inclined arc of more than 5 km (!). The calculated energy of the force pulse required to move a physical body of such mass it is $1.1•10^{17}$ Joules. To this day, there is no reasonably plausible explanation for this well described and documented case [6] in the scientific literature, nor for other similar catastrophic collapses. We believe that the Usoy collapse occurred due to a Coulomb explosion that took place at the moment of a sharp change in the cantilever loads in the parent body, when various natural mining, hydro-geological, and weather factors coincided in time. It is known that the displaced mass of the outcrop consisted of siliceous shales, and the floor of the outcrop funnel was lined with reddish marble. According to our hypothesis, as a result of a combination of various factors, the cantilever loads exceeded the strength limit of the rocks in the contact zone between the siliceous shales and the marble. The sudden redistribution of loads led to the emergence of accelerated electrons in the massif; having received energy from excited atoms and molecules and the energy of inertial forces at the moment of acceleration, they were forced to leave the crystal lattices. The electromagnetic field induced by the moving flow of electrons rotated the dipoles of the marble's hydrated water, which isolated the ions of the crystal lattice and compensated for the Coulomb forces of attraction between the ions and electrons by the value of the dielectric constant, which triggered Coulomb explosion reactions. The resulting force impulse with an energy of $1.1•10^{17}$ J threw part of the mountain massif with a volume of 1.5 km^3 to a distance of 5 km. In addition, the researchers discovered melted pieces of rock, which in no way fit the gravitational collapse hypothesis and serve as strong evidence of a Coulomb explosion process. We believe that something similar happened in the Nepalese mountains. The first thing we would like to highlight is that the geological basement in the Langtang–Liurung region of the Himalayas is composed of highly mineralized metamorphic rocks — gneisses, siliceous shales, as well as granite and leucogranite intrusions, among which the following minerals predominate: biotite, muscovite, quartz, garnet, staurolite, chlorite, feldspars and plagioclase, and marble. The same rock composition also predominates in the geological

structure of the Pamir Mountains, where the Usoy collapse occurred. On the morning of August 26, as a result of a combination of various natural factors, the cantilever loads in the massif of the mountain peaks Langtang-Lirung and Tsangbu-Ri exceeded the strength limit of the rocks in the contact zone between the siliceous shales and marble. The sudden redistribution of loads led to the emergence of accelerated electrons in the massif; having received energy from excited atoms and molecules and the energy of inertial forces at the moment of acceleration, they left the crystal lattices of the rocks. The electromagnetic field induced by the moving flow of electrons rotated the dipoles of the hydrated water in the marble, which isolated the ions of the crystal lattice and compensated for the Coulomb forces of attraction between the ions and electrons by the value of the dielectric constant, which triggered Coulomb explosion reactions. The resulting force impulse lifted the underlying rock layer along with the glacier resting on it, which rushed down the valley.

Conclusion

Based on the above material, we can conclude that the source of the catastrophic rock collapse in Nepal was the Coulomb explosion of the rock's crystal lattices, which was caused by a sudden change in the thermodynamic state of the rock mass and the appearance of accelerated electrons in the mass. The presence of hydrated water molecules and mineral components of the rocks catalyzed the Coulomb explosion process. The commonplace nature of the Coulomb explosion process, convincingly demonstrated in the reaction of sodium in water, dispelled the myth about the Coulomb explosion as a process capable of occurring only under high energy expenditures and parameters, at high P and T, and only in special cases supposedly unattainable under normal conditions of matter existence. Based on the examples presented, we demonstrated the possibility of a Coulomb explosion in rocks of the Earth's crust, which led to a catastrophic landslide in the mountains of Nepal.

Declarations

There was no Funding, Corresponding author: Serguei Bychkov, Consent to Participate declaration: not applicable, Consent to Publish declaration: not applicable, Ethics and Consent declaration: not applicable, the Data Availability Statement: not applicable.

Author Contribution

I, Serguei Dychkov, wrote the main manuscript text and I am the sole author of the article.

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Figures

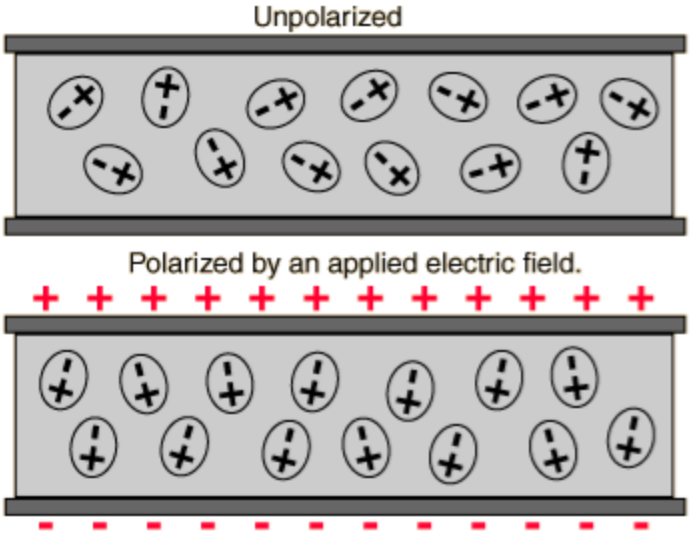


Figure 1

Physical diagram of polarization

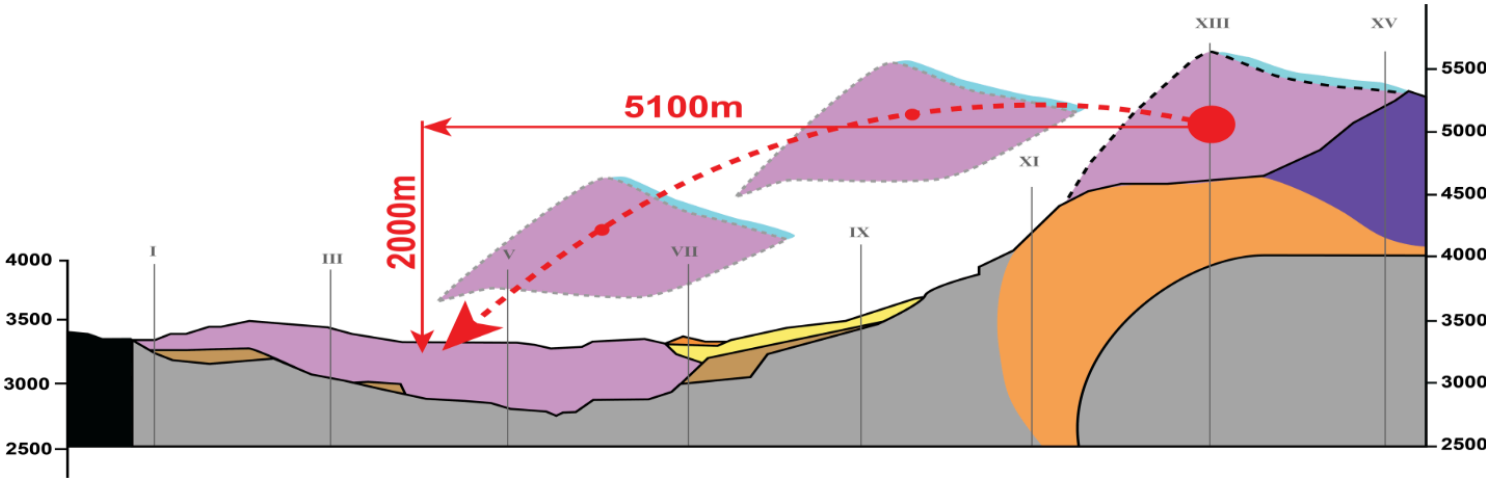


Figure 2

The Usoi landslide [6], page 280