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PREDICTION OF EARTHQUAKES AND TSUNAMIS

1.2.6. Destruction of the stone, the ocean floor and the Earth's surface

Investigation of the causes and mechanism of solid destruction in nature is the subject of physical geology. However, the study of sparks, the use of wood as a mold and the study of the process of breaking stone to understand the mechanism of cracking in metals is due to two factors. First, these phenomena occur in accordance with the laws of nature, which can be disclosed, and secondly, it excludes the influence of the human factor.

The spark caused by the impact of metal on the stone, was used by a man thousands of years ago. However, electromagnetic radiation in the X-ray range has been investigated for the first time. Wet wood was used to cool the melt on the basis of those amazing properties that manifest themselves in the synthesis of plants due to the interaction of photons and excitons. The turn of the flower to the sun is caused by the transformation of photon energy into mechanical energy. There is no doubt that the rise of water from the root of the pine to a height of 40-50 meters is due to the additional energy that is transferred to the molecules of water from the sun by means of photons.

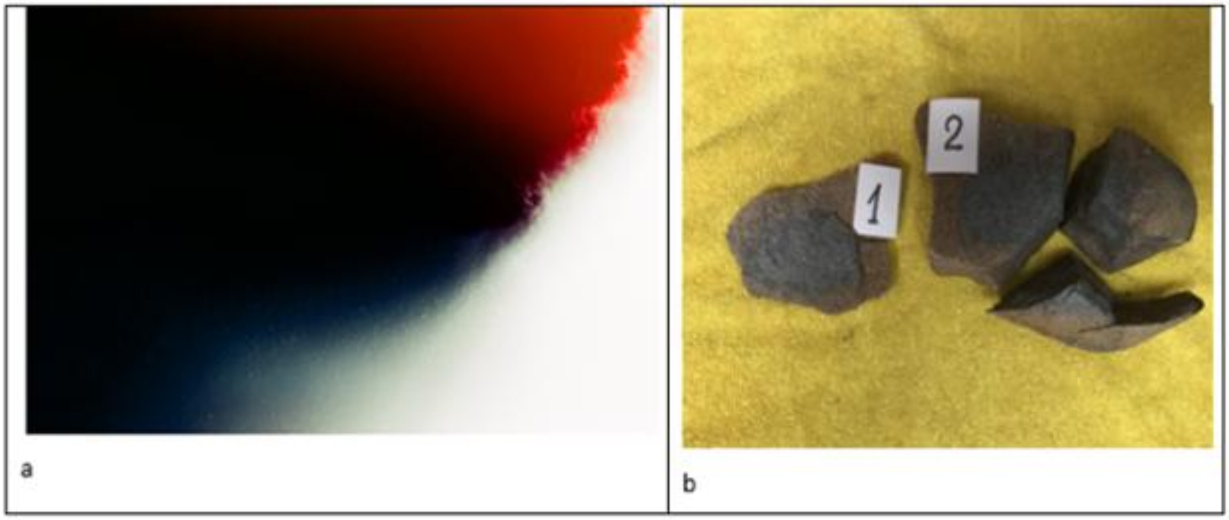

Fig. 18

A barely discernible crack formed in the stone shown in Fig. 12, after heating to a temperature of ~ 500°C. Intensive cooling with water led to the separation of the stone into two fragments, as can be seen in Fig. 12[1]. Between the hardened part of fragments 1 and 2, there was a layer of unformed stone (Fig. 18 b). A larger fragment collapsed into three parts after a week of irradiation to the sun's rays, but even then, the destruction continues. The formation of an unhardened layer inside the stone facilitated the process of destruction.

Photo Fig.18a is especially important for understanding the process of destruction. The red color is due to the radiation from the hardened part of the fragment 1, the black color is the crack region, the blue is the non-hardened sand layer. A dark area similar to the one fixed in Fig. 8a, was observed 16 times in the metal.

Consequently, in all those 16 *cases a crack in the metal was observed.*

[1] See Attachments

Alloys of metals, composite materials consist of various chemical elements that form compounds. The formation of such compounds is accompanied by the release of energy. For example, the enthalpy of formation one molecule of titanium nitride is 3.49 eV, of aluminum dioxide is 17.36 eV. The mechanical and thermodynamic properties of these compounds differ from the properties of titanium and aluminum, respectively. The formation of such compounds in the main matrix is accompanied by the formation of a boundary whose structure changes as a result of heat absorption. The generation of cracks often occurs at the boundary of the inhomogeneity, as shown in Fig.18.

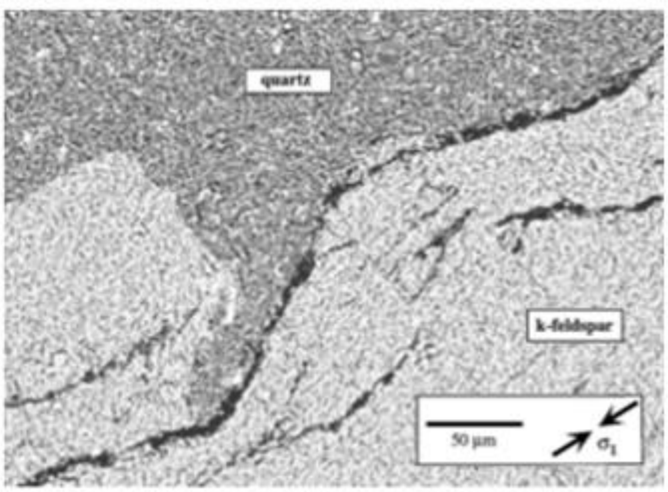

Fig. 19

1. A photograph of a crack formed at the feldspar and quartz boundary, obtained with a scanning electron microscope [21 E. Eberhardt, B. Stimpson, and D. Stead, *Effects of Grain Size on the Initiation and Propagation Thresholds of Stress-induced Brittle Fractures*, Rock Mech. Rock Engng. **32** (2), 81-99. (1999)], is shown in Fig. 19.

Similar photos, as noted above, were observed in the metal, but they differ in that they demonstrate a defect that was formed not only on the surface, but also inside the sample. The experiments described above showed that X-ray photons are emitted from atoms, regardless of its location in the solid.

Multi-kilometer cracks, similar to those described above, have been repeatedly observed in nature. It is established that the ridges on the ocean floor move towards each other, forming cracks.

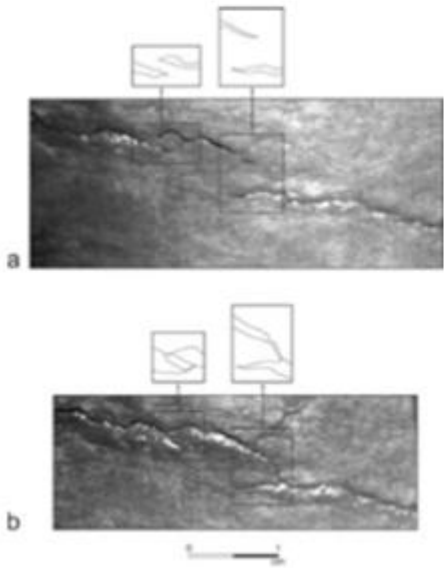

Fig. 20

Simulation of these processes on a scale of 1: 2,000,000 was performed in [22 Tatiana Tentler, Analogue modeling of tension fracture pattern in relation to mid-ocean ridge propagation GEOPHYSICAL RESEARCH LETTERS, VOL. 30, NO. 6, 1268, doi:10.1029/2002GL015741, 2003]. The formation of cracks was carried out under the action of centrifugal forces. The result of the experiment for two types of opposing cracks is shown in Fig. 20.

X-ray radiation caused by the formation of a 30 cm^2 crack is shown in Fig. 18. We can imagine the energy and power of the radiation that accompanies the motion of the ocean floor ridges.

This means that the motion of the ocean ridges can be monitored with the help of sensors of X-ray radiation and spacecrafts.

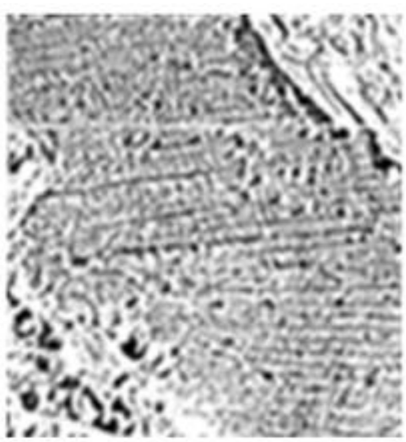

Fig. 21 a

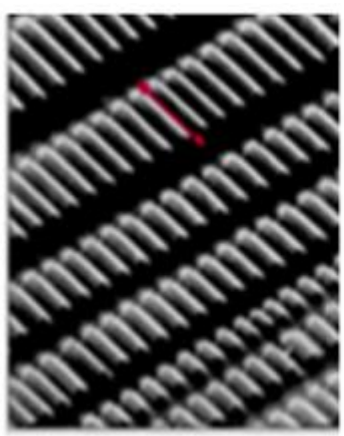

Fig. 21 b

Simulation of mechanical processes occurring at the bottom of the ocean is justified by the fact that the reaction to the external action is due to the transition of electrons not in the valence band, but from the energy levels located below it. In this case, the photon energy does not depend on what other atoms surround the atom that emitted it.

1. Modeling of ocean bottom deformation processes, Fig. 21 a, caused by the motion of the continent, was performed in [23 L. Volynskii and S.L. S.L Bazhenov, *Folding instabilities and of the thin coating on a soft polymer substrate as a model of oceanic crust*. Geofisika Internationale, 40, No 2, 87-95, (2001)]. Platinum film 4 nm thick was deposited on the surface of the polymer film. The stretching of the polymer film by 100%, as indicated by the arrow, led to the rupture of the platinum film into fragments, as shown in Fig. 21 b, similar to the breaks in the ocean floor.

The rupture of the platinum film in a direction that is perpendicular to the applied force disproves the models adopted in fracture mechanics.

Earthquakes, landslides, tsunamis are the most dangerous natural phenomena that a person cannot prevent. The warning of danger remains the only possibility for salvation. Tsunami hazard assessment is carried out on the basis of seismic waves, the radiation of which is due to ground motion, the change in the intensity of the magnetic field and the electrical conductivity of the rocks.

The fact that any deformation is accompanied by X-ray radiation before the appearance of cracks allows us to use this fact for earlier forecasting of earthquakes and tsunamis by placing X-ray sensors, as is done for measuring other signals.

Modeling of the earthquake prediction process is demonstrated by the example of the destruction of marble, granite and flagstone.

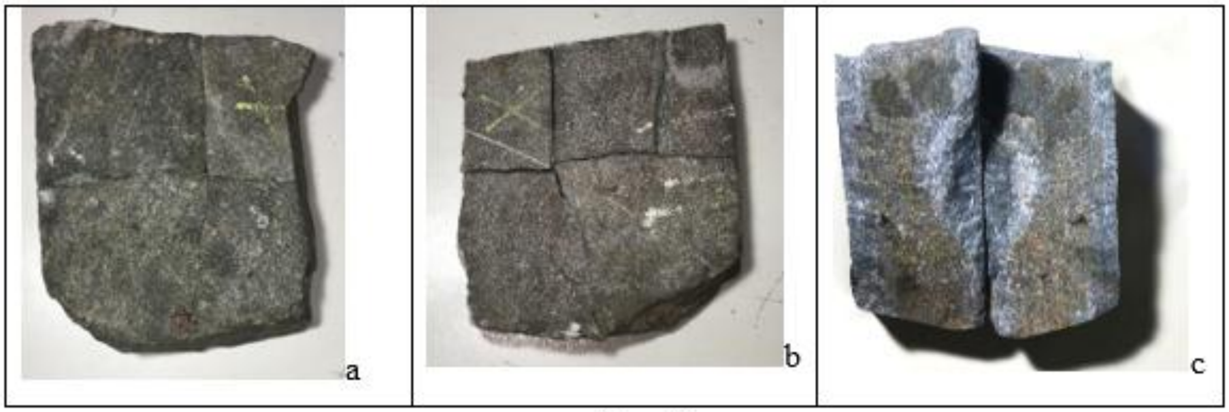

Fig. 22

The sample of flagstone shown in Fig. 22, 52 mm thick, was deformed using a 25-ton press. Five fragments were obtained as a result of four experiments. All fragments have a clear cut, which indicates the crystalline state of the sample.

All the experiments in this study are designed to demonstrate the possibility of using in the industry electromagnetic radiation accompanying deformation.

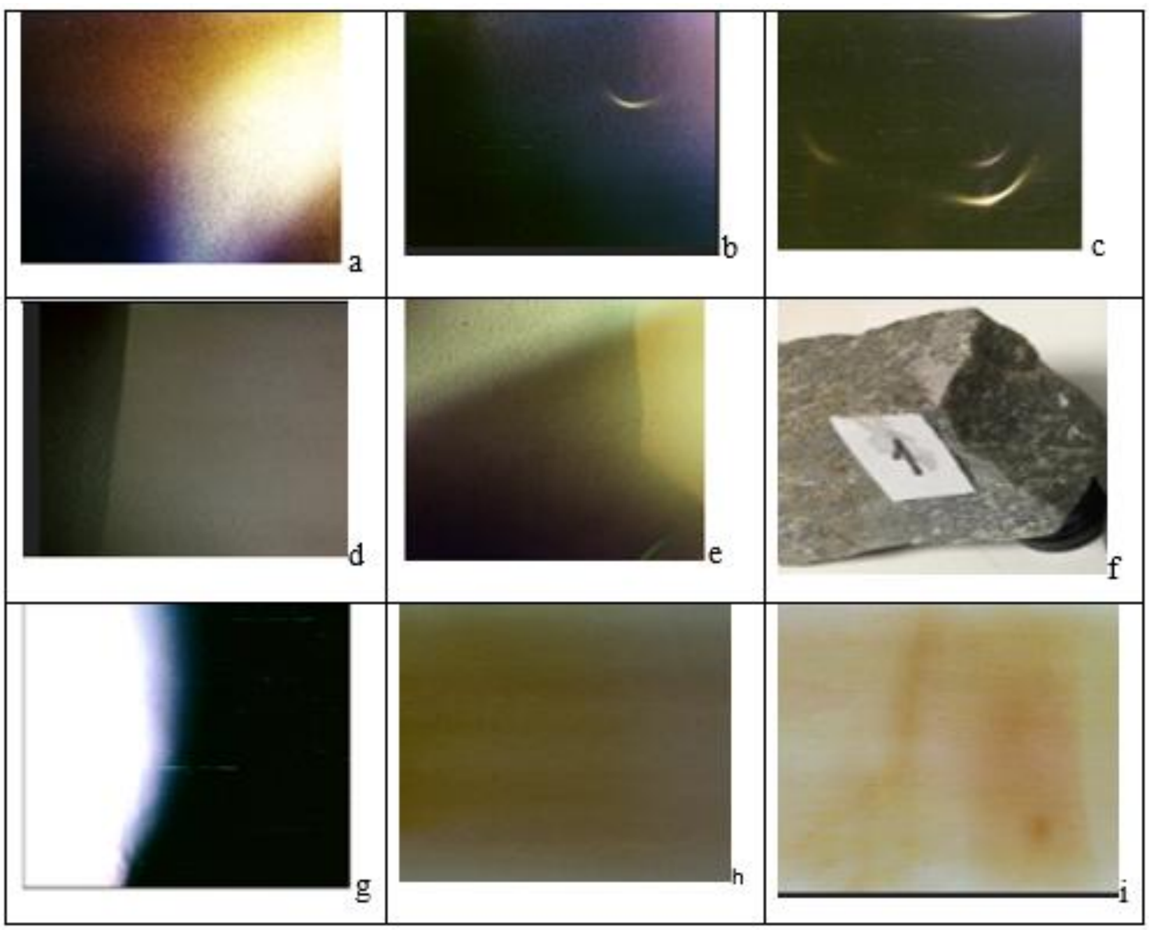

Fig. 22 (1)

Detailed analysis of the processes of destruction of stone, as a building material, the subject of a special study. We, in this regard, confine ourselves to a brief analysis of the most important aspects. The film recorded 12 frames of cracks formation in the flagstone, 8 of which are shown in Fig. 22 (1). Frame f illustrates the crack surface shown in frame e. The crack in the photographs is a dark area, since in it the energy is absorbed by the atoms, between which the bond breaks. Such dark areas are fixed earlier. These areas are fixed in photographs a, b, d, e, g. Each of the photographs demonstrates the features of crack formation. The glow, as noted earlier, is fixed both before the formation of the crack and after that, but we cannot differentiate this fact in the photographs a, b, e, g.

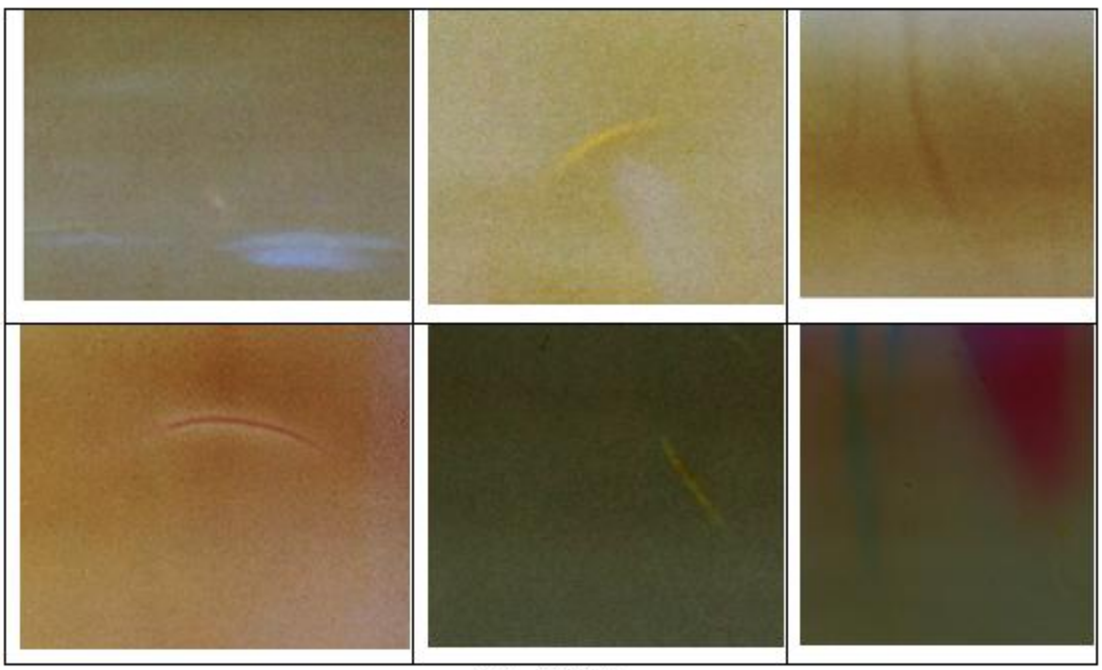

Fig. 22 (2)

The photograph g is of particular interest due to the fact that it illustrates the foreign inclusion region shown in Fig. 22 c, formed during crystal growth. The crack divided this area into two parts. Fig. 22 g shows that one of the parts, bordering on the crack, is shining. This luminescence is due to the delayed radiation from the atoms of the energy source.

Photo Fig. 22 c demonstrates another foreign region, the brown color, which was fixed on the photocell in Fig. 22 (1) h and Fig. 22 (1) i, but visually became visible only after a week of storage in air. This transformation is typical for the corrosion of a metal.

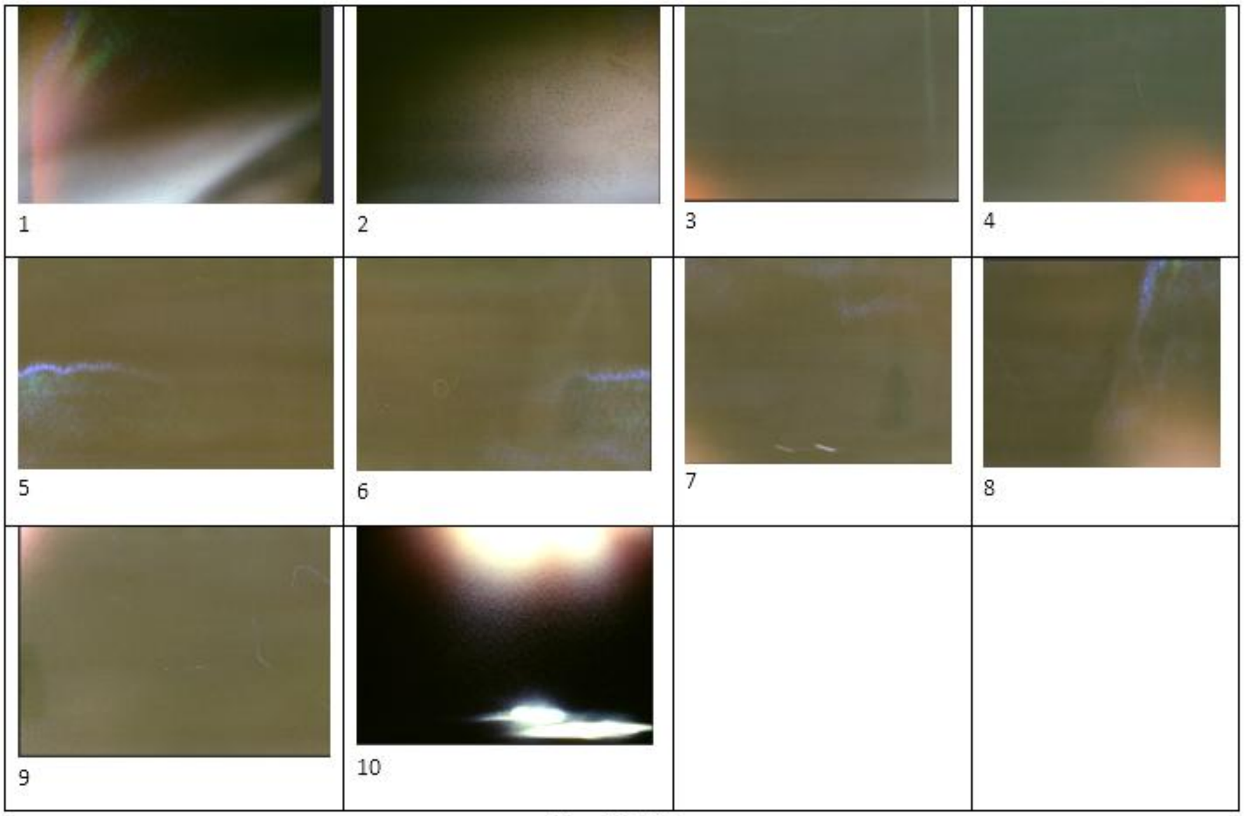

Fig. 22 (3)

Arc-shaped glowing defects, fixed in Fig. 22 (1) b, c, and e have been observed repeatedly and are shown in Fig. 25 (spiral), frames 5, 16, 18; Fig. 28 (3), frames 3.1, 3.13; Fig. 28 (4), frames 4.4 and 1.10.

The six photographs shown in Fig. 22 (2), illustrate the defects that have arisen in the marble plate outside the cracks, but the photographic method does not allow to determine when the radiation occurred before or after failure. The spectral composition of the defects is due to the atoms of the chemical element that form it, but the clearly limited form remains unsolved.

The granite plate, 10 mm thick and 300×300 mm^2, was destroyed at a higher strain rate than a marble plate of the same size. The direction of cracks in marble and granite without prior attenuation is unpredictable, like the formation of cracks in the glass.

The area of the film is no more than 12% of the sample area. This led to the fact that a crack over the surface of the film was formed only in one case, which is fixed on the frame 10, as shown in Fig. 22 (3).

The second sample of the flagstone of the same thickness and area as the first, collapsed at a higher loading speed.

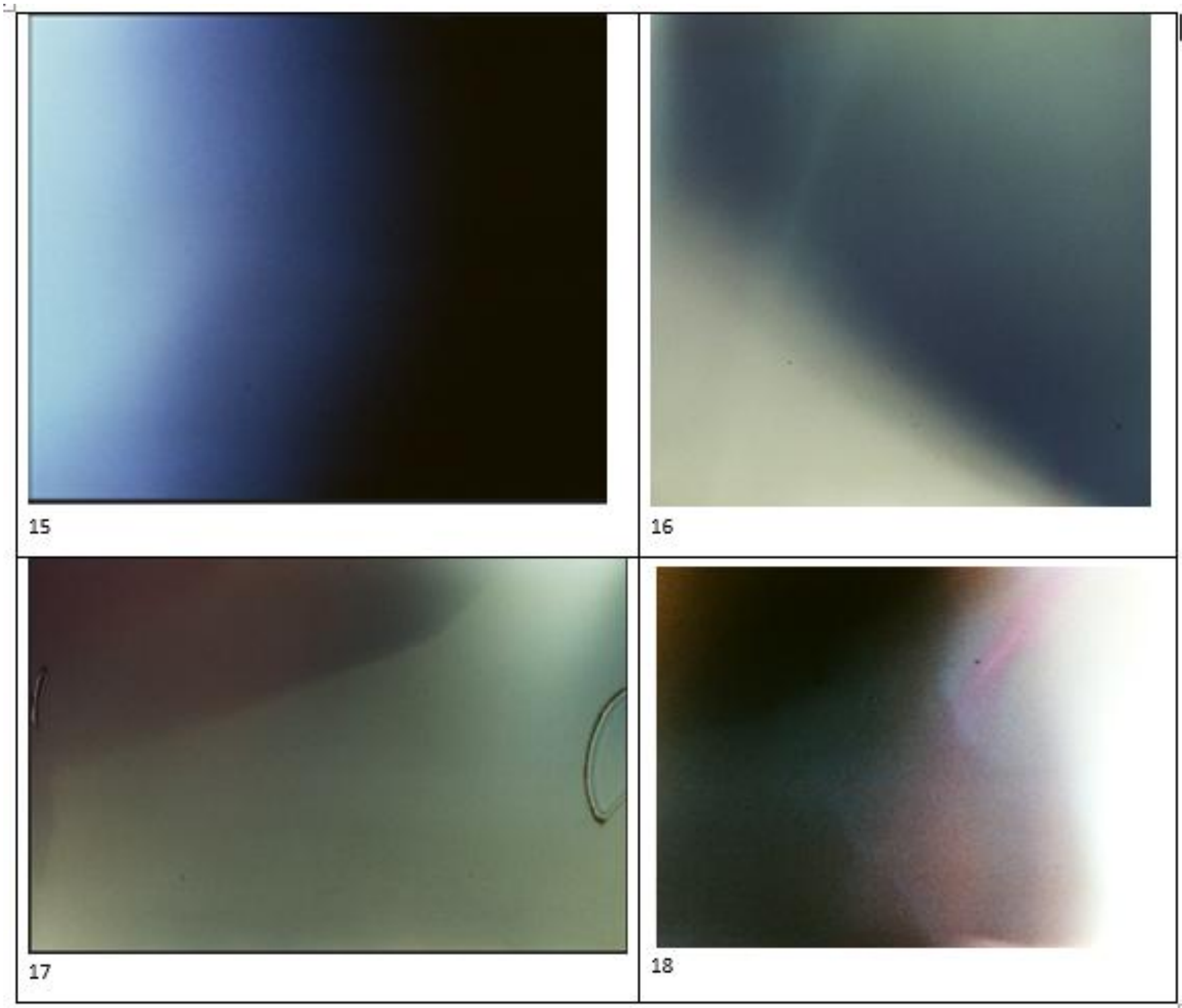

Fig. 22 (4)

The crystal structure of the second sample of the flagstone was different from the structure of the first one in that the faces had the shape of a rectangle, as in the first, the shape of a parallelepiped with dihedral angles of 80 ° and 100°. Cracks in the second sample of the flagstone were recorded on nine frames out of ten, shown in Fig. 22 (4) and Fig. 22 (5). The change in the shape of the crack from frame 15 to frame 23 is due to the impulsive character of its formation. Frames 19-22 indicate the formation of a clearly defined crack boundary.

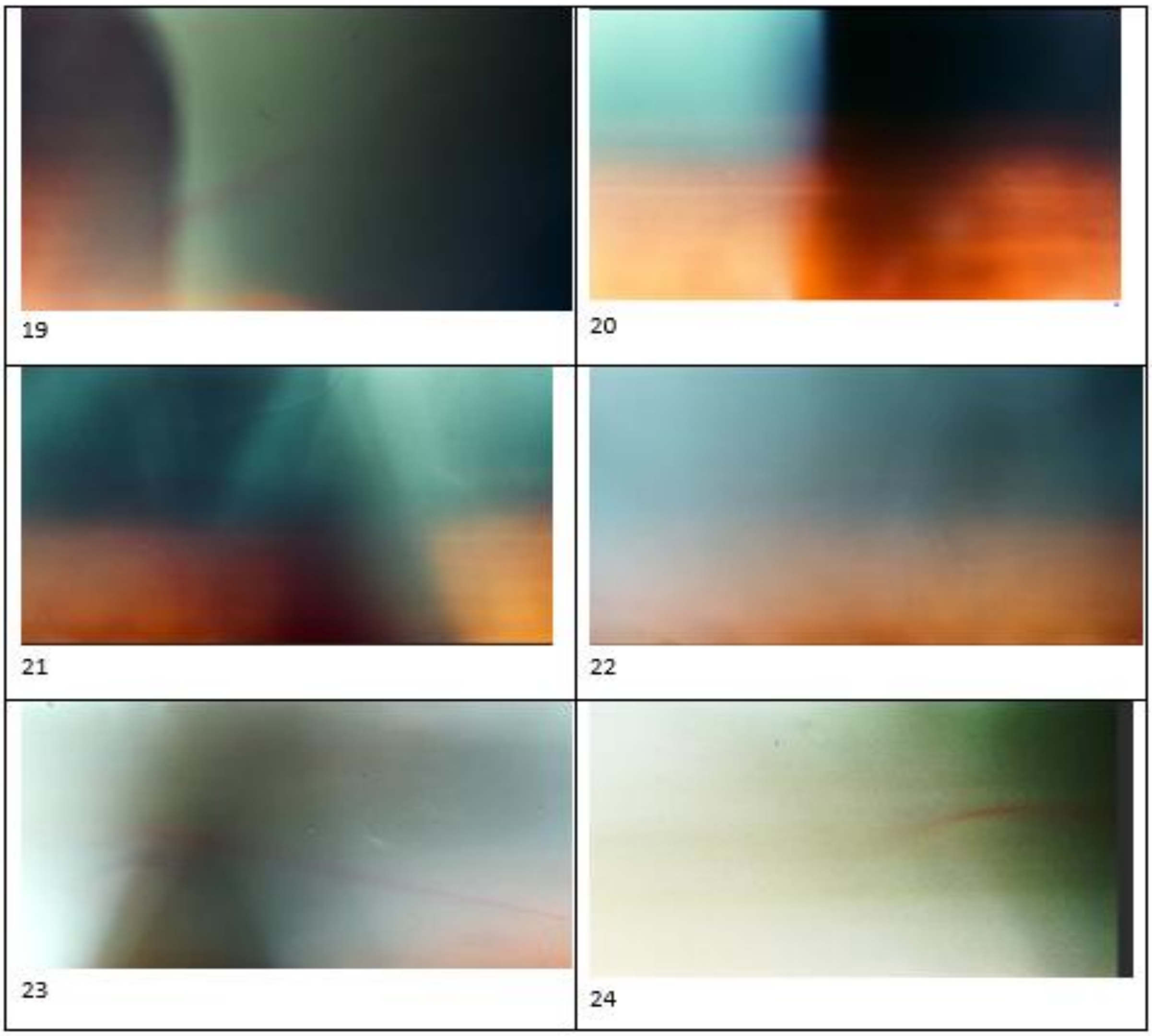

Fig. 22 (5)

The projection of a luminous defect in the form of a pink string is observed on frames 18, 19, 23, 24. The length of this projection on the *xy* plane is ~ 140 mm.

It is known that on the surface of the crack there are hills and valleys, strata. The above pictures show how the surface of cracks forms.

Thus, it has been experimentally confirmed that the processes of formation of X-ray sources in materials forming mountains are not separated from processes in other solids. Continuous monitoring of electromagnetic, including X-ray, radiation from seismically dangerous areas of the earth's surface and ocean floor allows more accurate early stage diagnostics of earthquakes.

Thus, it has been experimentally confirmed that the processes of X-ray sources formation in materials forming mountains are not different from processes in other solids. Continuous monitoring of electromagnetic, including X-ray, radiation from seismically dangerous areas of the earth's surface and the ocean floor makes it possible to diagnose earthquakes at an early stage and to warn about the possibility of a tsunami.

Attachment

1.2.5. X-ray radiation at a temperature gradient in a solid and solidification of a liquid

The mirror glass plate shown in Fig. 8, 1 was heated by the flame of a gas burner. Two cracks originated in the place of maximum temperature. The radiation of X-rays in the formation of a vertical crack 1 is fixed in the photograph (Fig. 9 a).

Fig. 8

As we see, the photograph shows only the radiation of the regions located on the edges of the crack on which the fragments were formed.

The glow in the crack region is not fixed, similar to the one shown in Fig. 3 e.

The bottom of the crystal vase, the thickness of which exceeded two centimeters, was divided into four fragments with intense point heating. Two fragments 2 and 3 are shown in Fig. 8. X-ray radiation from these fragments is fixed in the photographs Fig. 9 b, Fig. 9 c.

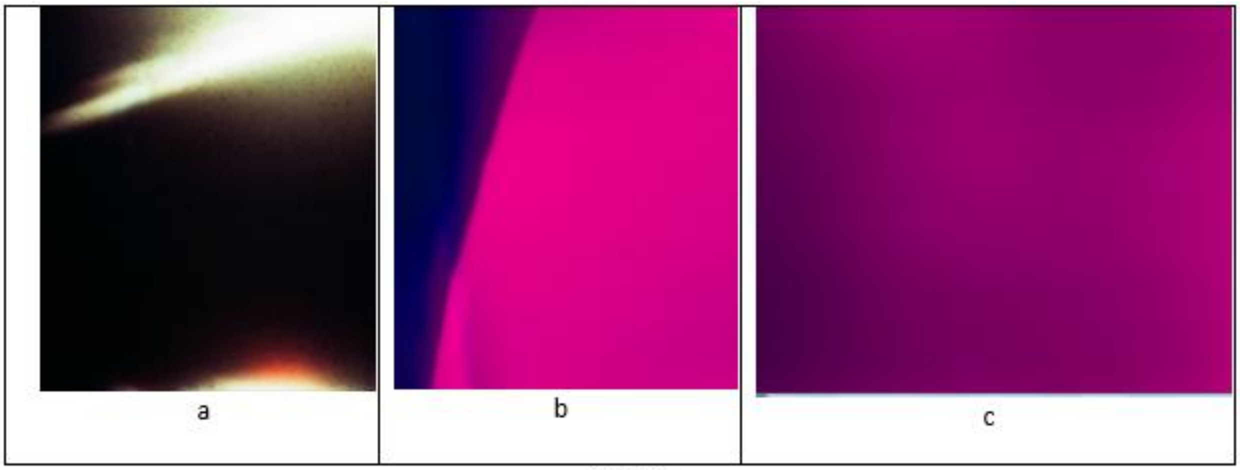

Fig. 9

We draw attention to the fact that, firstly, the radiation from the region between the fragments is not fixed, and secondly, the fragments that split off from the left and in the center flew out of the frame.

Fig. 12

Glow caused by friction of sand particles and helicopter blades in the desert while landing and taking off