Consideration on backflow phenomenon of particles at edge of platform

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Our seniors were experimenting "wind speed at which particles begin to move" with bowled volcanic ash particles, sanded shale particles, and alum grinded in a mortar. At that time, they discovered a phenomenon in which the particles move in the opposite direction to the direction of the wind at the wind speed at which the particles barely move or do not move at the edge of the platform.
We considered the cause of this phenomenon as follows.
・When the wind hits the pedestal, turbulence occurs in the air current, and the volcanic ash particles are swept away by the air current and flow back.
・Like a yacht sailing against the wind, crystal planes of mineral grains may act like sails and flow backwards.
And we conducted two hypothetical experiments to prove this hypothesis.
First, we created a wind tunnel and observed air turbulence with incense smoke.
Secondly, 15 types of wooden crystal system model specimens were exposed to air from an air compressor, and the crystal system model was observed to flow backwards.
As the result of the first experiment, we were able to observe "airflow turbulence that seems to be backflow".
As a second experimental result, only monoclinic pyramids caused backflow.
Currently, we are making a crystal system model with cardboard and conducting experiments to see if backflow occurs due to the wind of the circulator, and analyzing the video of the backflow of volcanic ash particles to investigate the relationship between the crystal system of minerals and the backflow phenomenon.

Keywords: Backflow, Wind tunnel, Crystal system model, Volcanic ash particles

台端における粒子の逆流現象に関する考察

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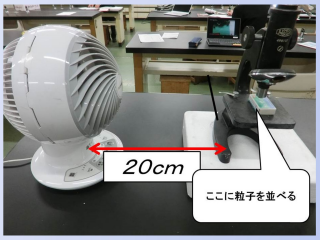
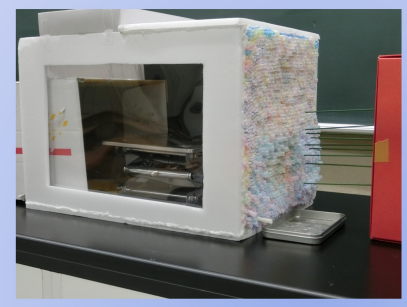
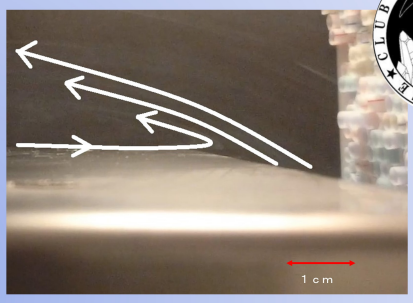


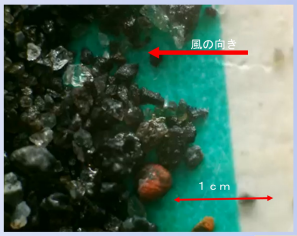
顕微鏡で粒子の逆流を観察

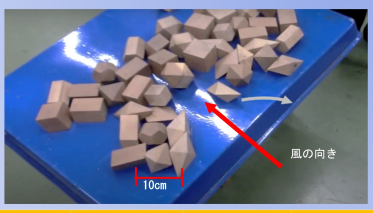


風洞実験



気流の乱れを観察





結晶系模型15種（木製標本）では単斜晶系錐形のみ逆流が

現在厚紙で作った結晶系模型でも実験中

逆流した火山灰粒子の種類

鉱物名	石英	長石	黒雲母	角閃石	輝石	橄欖石	磁鉄鉱	その他
粒子数	14	10	0	3	40	0	27	41