

Photography of snow grains in the field

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ABSTRACT: Have you ever been in doubt about how to distinguish snow grains? Have you ever wanted to record snow grains' images? This is possible by using the collimate method. This method is not a new invention, rather it is a general method used in star watching and bird watching, but it isn't commonly used when looking at snow grains. The equipment used is a loupe for the slide film (8-15 times), a compact digital camera (which has a close-up feature for objects closer than 25 cm) and snow crystal screen. The merits of this method are as follows:

- It works in narrow spaces (about 50x50 cm).
- It works even in moderate-strong wind conditions.
- It can be used by ski patrol & mountain guides as well as recreationalists, and is not just for scientists (The equipment is inexpensive, compact, easy to handle and most probably you already have it).
- These photographs are optimal for educational purposes (different from the microphotographs, used to take photographs of snow grains with the same sight as you would see it in snow pit observations).

KEYWORDS: Snow grains, Photography method, Collimate method, Field observation

1. INTRODUCTION

Because the conventional photography of snow grain took time, effort and a lot of equipments are necessary, it is unsuitable for field workers except some scientist who has especial skills and volition. It is the one of the cause of that the avalanche disaster research reports included the photograph of the snow grains which were forming weak layer are rare.

If it is possible to take a photograph easily, it is useful for information sharing and record in the operation. In addition, Beginner observers have doubt about how to distinguish snow grains but if recording as the photograph, it is possible to have an expert confirm after returning from the field.

2. EQUIPMENTS

The equipments which are necessary for the photography are as shown below. These equipments are inexpensive, compact, easy to handle and most probably you already have it.

- Digital camera: a compact digital camera which has a close-up feature for objects closer than 25 cm
- Loupe: a loupe for the slide film (8-15 times)

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- Snow crystal screen: a plate with measure
- Additional useful goods
Brush: a paint brush to scatter the snow grains.
Lens cleaning cloth: synthetic fiber is recommended



Fig.1 Equipments

3. METHOD

3.1 BASIC TECHNIQUE

1st: turn the photographing mode to the macro-photography mode which were indicated flower icon.

2nd: take photographs by hold the digital camera against the eyepiece of the loupe directly as just shown in figure 2.

Because camera is supported by the loupe, camera shake doesn't happen. The snow-grains which are covered with the skirt of the loupe never blown off in even in moderate-strong wind conditions.



Fig.2 Basic technique

The auto focus system works with this method. If the image is bent, try to adjust by operate the zoom adjusting switch (Fig.3).

You had better to take a photograph of field note in same time with the snow grain to organize the photographs (Fig.4).

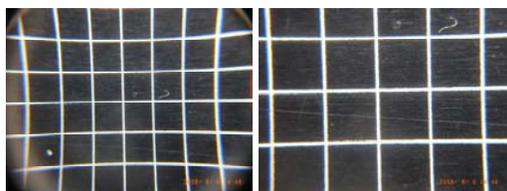


Fig.3 Adjusting by operate the zoom adjusting switch. Left: before, Right: after the adjusting. Both grids are 3mmx3mm.

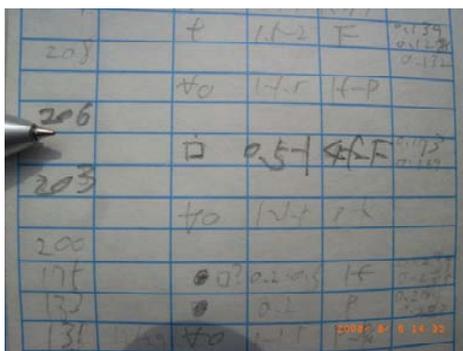


Fig.4 A photograph of field note to organize the photographs of snow grains.

3.2 ADDITIONAL IDEAS FOR TOUGH CONDITION

It introduces some idea for the photography under the more tough conditions. In snowy condition, a small snow cave is useful (Fig.5). The snow cave prevents that falling snow mixing with snow grains which are the object of the photography. Even in the night, you can take

photograph of snow grains by using a head light (Fig.6). The contours of snow grains are stood up by the reflected light made by the head light.



Fig.5 Small snow cave (about 50cm x 50cm) is useful in snowy condition



RED light is recommended

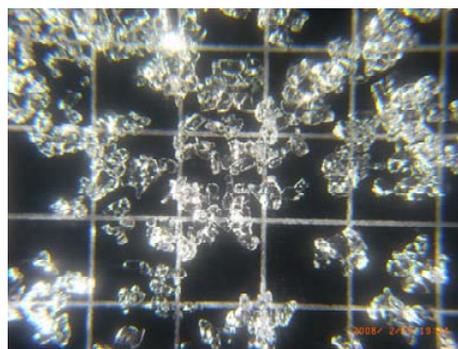


Fig.6A head light is useful in dark condition. The contours of snow grains are stood up by the reflected light made by the head light.

4. WHY DOES IT WORKS?

As for the eyes of the human being, the focus suits to the about 25 cm distance, for that reason the optical instruments (the loupe, the telescope, the microscope etc.) which are used by contact with eyes are adjusted to the focal distance of about 25 cm. There for the camera which has a

close-up feature for objects closer than 25 cm can be used by contact with the eyepiece of these optical instruments directly.

The digital camera forms the image on the CCD instead of the film to records an image.

Because the size of the CCD is smaller than the film, it is possible to make shorter the distance between the lens and the CCD than the distance between the lens and the film.

Therefore, the digital camera can approach a subject closer than the film camera (Fig7), and most of the marketed compact digital cameras have a close-up feature for objects closer than 25 cm. Also, the digital camera brings into focus by using the contrast of the image formed on the CCD without measuring the distance from the subject. Therefore, the automatic focus photography is possible through the loupe.

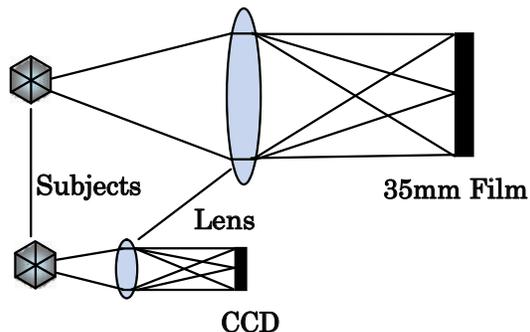


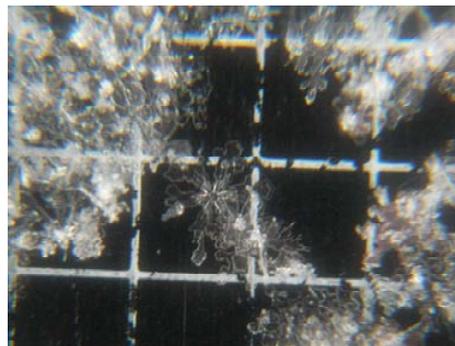
Fig.7 The digital camera can approach a subject more than a film camera

5. CONCLUDING REMARK

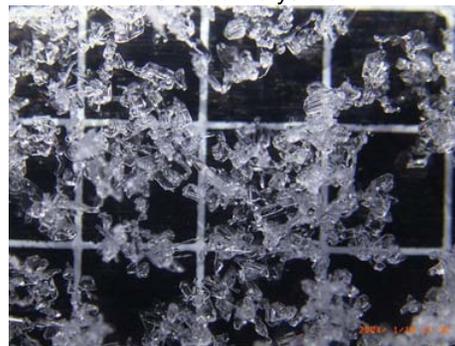
The photography method explained in this paper is not a new invention, rather it is a general method used in star watching and bird watching, but it isn't commonly used when looking at snow grains.

This method has the following merit. I hope the method will be used many avalanche peoples.

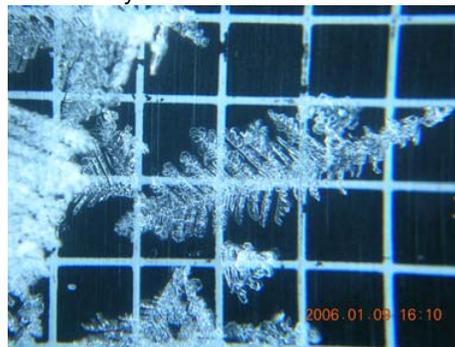
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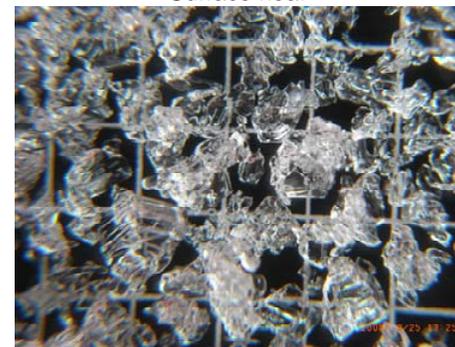
New snow crystals



Facetted crystals formed near snow surface



Surface hoar



Depth hoar

Fig.8 Examples of the photograph of snow grains
The size of all of grids which are taken as the backdrops are 3mmx3mm.