

BASIC RULES IN GEOGRAPHICAL PHOTOGRAPHY

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ABSTRACT: *Photography plays a key role in geographical studies but also in teaching geography. For the geographical photography there are some important aspects regarding the photographic technique: setting the correct size of the image, white balance, ISO sensitivity, image format, time exposure, aperture, knowing the functioning of the incorporated light bulb, focalization, the optic and digital zoom, measuring the luminosity in the scene that is about to be photographed. In this study, there will be presented the most important types of photography that are used in geography, while in the last part of the study, the most important rules that must be respected when framing and shooting are described. In the end it is presented a glossary which includes 29 terms of speciality that are used in this paper.*

Keywords: *geographical photography; characteristics of the camera; type of photography; rules;*

There are relatively few secrets of taking good photographs, but at the same time few are the people that know and apply them.

For a passionate geographer, the camera must be one of the items always taken to a fieldtrip next to a GPS, compass, altimeter, measuring tape or binoculars. This is because photographs can illustrate better the field conditions than the text or numbers. They can and must be part of any geographical study, no matter if it is about a project seminar, dissertation or degree diploma, PhD thesis, monograph or any other book or scientific paper with geographical content.

Romanian geography has many resonant names of researchers and professors that have well known how to combine in their works the scientific component with the illustrative one through photographs: G. Vâlsan, T. Morariu, V. Sencu, Gh. Niculescu, N. Popescu, M. Geanana, M. Grigore, M. Ielenicz, Gr. Posea and others.

How did these geographers managed to bring closer to us, the beneficiary of their studies, the filed, landscapes, settlements, people or the traditions specific to every place?

1. Very well knowing of the characteristics of the camera and verifying the functioning of it

In the case of film cameras we have to know and verify the functioning of some key devices – of course before mounting the film.

The most important thing is that the shutter functions well (the exposure mechanism, M. Ielenicz, 1989). For this you have to open the cover from the back of the camera, point it towards a source of light and take some free shots at different time exposures (for instance at 1/250 s, 1/60 s, 1/15 s). If during the shooting through the opened camera we spark the light that comes through the lens for a very short period of time (1/250 s), than for a longer period of time (1/60 s) and 1/15 s respectively, this means that the shutter functions correctly.

Very important is to also verify if the mechanism that rolls the film functions properly (in the same manner, with the back cover opened, we observe if the wheels that roll the film move constantly and complete while we pull the corresponding lever. This thing however is no longer necessary for the

latest film cameras which use the batteries power to drag the film.

Last but not least, we verify the lens – it must not have any space for moving, to focus without delays and having the zoom functioning properly.

Mounting the film properly into the camera carries a big importance, as in the case of improper mounting of the film, later it would compromise the whole effort of the photographer.

When mounting the film, the camera user must correctly position it properly in the designated place, the free end of the film to be well rolled up on the spool (especially at the old models of Zenit, Praktika etc) or to be positioned at the sign indicated by the producer at newer models.

At the same time, the back cover of the camera must be verified that has been well shut, otherwise in case of accidental opening of the cover the film would be compromise even if it has not been exposed yet.

For the digital cameras the usage is somewhat more complicated, although the stages of mounting and dismounting the film are eliminated. A good photographer must know the following steps of setting up his digital camera:

- the resolution or dimensions of the photographs; for example with a resolution of 1 MP (1 megapixel, that means 1 million pixels) photos no larger than 10 x 15 format can be taken at good quality; with the resolution of 3 MP photos of 13 x 18 cm format can be taken, with 5 MP – photos of 21 x 30 cm, meaning A4, as for 8 MP – pictures of 30 x 42 cm, that is A3; for posters of A2 or larger we must have a camera with a resolution of more than 15 MP;
- the format of the photographs, meaning the ratio between length and height, which can be 4:3 (as for desktop or the usual computer screen), 3:2 (as the positions from the photographic film or the usual postcard, 16:9 (as the TV with LCD);

- white balance (WB) – the function that adapts the image sensor at the colour temperature of the source of light coming from the photographed scene: sun, cloudy sky, incandescent light bulb, neon light, flash bulb etc;
- the sensitivity (ISO) – the reaction speed of the sensor to a certain quantity of light from the scene;
- time exposure – time in seconds, usually goes between 0 and 1. that will take the sensor to expose to the light from the scene;
- aperture (or the luminosity of the lens or the quantity of light that passes through lens, set by the aperture);
- focus or clarity on a certain subject wanted by the photographer (can be manual or automated);
- the optical zoom – which allows to frame according to the goal followed by the photographer;
- the digital zoom – useful when we want to verify on the camera display the clarity of the photographs on some areas;
- the setting of the flash bulb (auto-flash when is unnecessary may modify the white balance and consumes the battery);
- the intensity of the incorporated flashbulb;
- self-timer setting;
- image count (keeping up with the number of photos that we can still take on de SD card or film is important);
- red-eye reduction function (a flash of the flashbulb before the snapshot, which, if not necessary, may cause battery consumption);
- the incorporated exposure-meter (at modern cameras this information appears on the LCD screen – how much the photo that is to be taken is exposed);
- area of measuring subject enlightenment (if the subject is compared with the whole frame, the centre or a certain spot from the picture);
- the macro function with which the camera will focus in priority to the

subjects situated at small distances from the lens, less than 50 cm;

- shooting modes (pre-set) – M (manual meaning photo shooting with manual set of ISO, white balance, time exposure or aperture), Av (aperture value, which lets you choose only the aperture value, the rest of the parameters being established automatically by the camera according to this setting), Tv (time value lets you set the exposure time depending on which the camera will automatically set the other parameters), A-dep (automatic depth of field – the camera chooses automatically the smallest possible value of the aperture for the widest area of depth), P (automatic program – the camera chooses automatically only the aperture and time exposure values for the best exposure), portrait (the camera decides the parameters that are suitable so that the depth of field to be as small as possible for a good bokeh (blurred background) and skin and hair colours of the subject to be as homogenous as possible);
- landscape (the camera chooses the parameters so that the depth of field to be as large as possible and the colours of green and blue to be as more vivid etc.

2. Knowing the type of photography that is to be taken and the rules to be followed for each one

For a geographer the most used types of photography are: landscape, architecture photography, detail photography, macro and speleology photography.

For landscape:

- it will be used mostly the short focal distance (wide lens) and rarely normal; this is for having as much as possible from the view in one photo. Telephoto lens is rarely used (avalanches, erupting volcanoes etc.);
- it will be used small aperture values (1/11, 1/16, 1/22, 1/32) for obtaining a larger area of clarity (high depth of field);
- the direction of photographing must be also adapted so that in the picture we shall capture as much as possible from the indicating elements of the geographical environment. For instance, if we take a photo of Borăscu level surface somewhere in Parâng or Iezer Mountains, it is better to capture one or more peaks that dominate it or several valleys that got deepened below its level – fig. no. 1; a linear village it is recommended to be photographed in its direction of development or oblique but



Fig. 1. Landscape in Parâng Mountains (Borăscu surface, fragmented by Latorița's upper basin valleys)

- not perpendicular so to bring most of it in the frame;
- light direction must come from one side when we want to capture the relief forms (an alternative show of light and shadow will appear that will exaggerate properly the forms) – fig. no. 1; if the landscape is simple (hill area, table land, valley with artificial lake, sea limiting factor etc.), the light should come from one side, in order to diversify the composition. But if we want to show a forest (and its floristic composition) or rock layers on a slope (if there is an outcrop), the light must come from the back of the photographer – fig. no. 2; for a complicated landscape (industrial or with a scaffold, furnace or an urban landscape or a compact village) in which there are many edges, surfaces and angles, it is also recommended that the light should come from the back of the photographer or to make with the optic axis of the camera an angle as small as possible (max. 20°), in order to avoid any coverage due to the shades;
 - secondary elements usually play an important role in landscapes; for instance the so called depth elements are a must in a photography; they confer depth, perspective but also a pleasant aspect. Depth elements are objects positioned in the forefront of the photography (aside, above or down), of dark colour (but they may be medium bright), not distasteful (garbage basket), that cover only a small part of the subject: a lamp pile in an urban landscape, tree branches for a monotonous plain landscape, part of a wood fence for a humanised landscape in Apuseni Mountains, eaves of a house or chalet roof in the mountains (especially if it has big icicles), eaves or part of a wooden sculptured gate, rocks from a mountain slide rock for an alpine or subalpine landscape, part of a balustrade on a small ship on the Danube Gorges, usually even a person or almost any object – fig. no. 4.
 - the line of the horizon must be on either AB or CD lines as in fig. no. 3 (rule of



Fig. 2. Štirbaču Mare Mountain (Serbia, Danube Gorges); the light that comes from the back of the photographer underlines the geologic structure and the vegetation

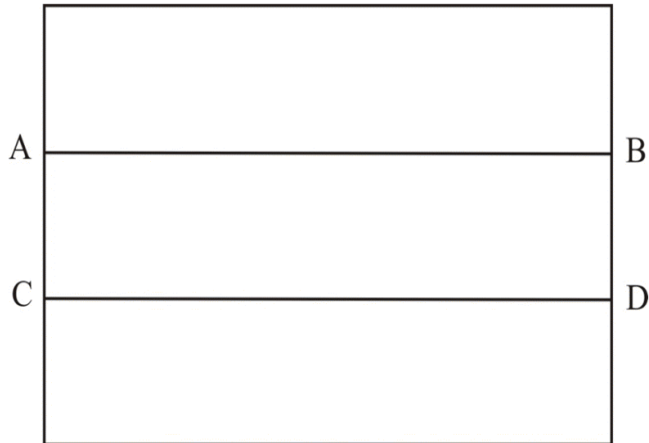


Fig. 3. The correct position of the horizon line for a landscape



Fig. 4. Landscape in Ceahlău Mountain; the depth element (the steppingstones made of sand stone from forefront) could be caught entirely thanks to the small focal distance (28 mm equivalent format 24x36).

thirds in photography), although there are particular situations in which this rule can be defied. Even so, there are few situations in which the horizon line will divide the picture in two equal halves or in which it will miss completely;

For the architectural photography attention will be paid to perspective and light. For the perspective lines to be less deformed as possible, it is recommended to take a few steps apart from the building and to take the picture with a bigger focal

distance – a telephoto lens (if not doing so and we use a wide lens from the basis of the building it will let the impression that the building falls backwards, an effect called vaulting). The ideal light for architectural photography is the one that comes from a sun covered by a thin layer of clouds, situated at a height of 20-50°; the sunlight it is recommended to form an angle with the facade of the photographed building, rarely to come from the back. It is definitely not indicated that the sunlight to come from the

front of the photographer, making the building to appear in the picture completely darkened, with no detail regarding the colour or architectural structure.

Detail photography (photographs of parts of natural or anthropogenic assemblies) represent a frequently used type of photography in geographical studies. The light is very important at this type of photography – it must come frontal, perpendicular on the subject (for instance when digging a soil profile the position of the sun when the profile will be ready must be approximated so that the light will come on the front wall).

The dimensions of the details are also very important (so we must use a measuring tape or if not, any object with very well-known dimensions such as a pen, a mobile phone, sunglasses, camera, compass, backpack etc.); one or more of these objects will be placed in the picture so that they will express the subject dimensions.

Macro photography (the subject is very close to the camera lens) is a spectacular type, being necessary to have special lens (macro lens) or special rings for macro (teleconverters). At compact digital cameras there is the macro function, which, once activated, simply solves this problem. The most important rules are:

- small aperture values (1/11, 1/16, 1/22, 1/32) will be used, in order to enlarge as much as possible the area with high clarity, which, in the case of close-up subjects, is generally reduced;
- on rock or mineral specimens an element for dimension will be used (coin, pen cover, lens cover etc.);
- a background as homogenous as possible will be created, simple, with a contrasting colour compared with the one of the subject (clip-board, table top, piece of paper or board).

Speleology photography is as fascinating as both spectacular and difficult, but not impossible as one may think. This type of photography requires at least two

accessories: the tripod and light sources (floodlights); if the floodlights are missing we can successfully use one or more flashlights. We do not recommend under no circumstances the use of the incorporated flash bulb of the camera or the one attached to it (it brings too much light on the forefront formations and almost none on the ones placed further from the camera; this sums up with the exaggerated and displeasing shadows of the forefront speleothems. Consequently the camera must be placed on the tripod, the sources of light (flashlights or floodlights) must be disposed on different positions in the frame, the white balance must be set on incandescent or auto WB, ISO sensitivity to be as low as possible (to avoid image noise), aperture at 1/8 value, time exposure must have values above 1 (more than a second) and shots may be taken. For variety, people can be placed in the frame, having their flashlights if wanted. If the cave has reduced dimensions a wide lens will be necessary, but if we find ourselves in a big cave chamber then we can use regular focal distances.

3. Rules to be followed when framing and shooting

- all the unnecessary elements from the frame to be eliminated (cables, wire, piles, garbage basket etc.);
- all the needless spaces, empty spaces (asphalt, grass, earth etc.);
- the main element not to be put in the centre of the image, but in one of the four points noted with 1 in figure no. 5 (The Golden Rule);
- the subject to be bright, clear and to have the biggest dimensions from the picture;
- the background on which the subject is projected must be simple and to have a colour contrasting the subject;
- in forefront of the image there should be the so-called depth elements (branches, arch, rocks, wall, and lamp etc. chapter 2, about the landscape);

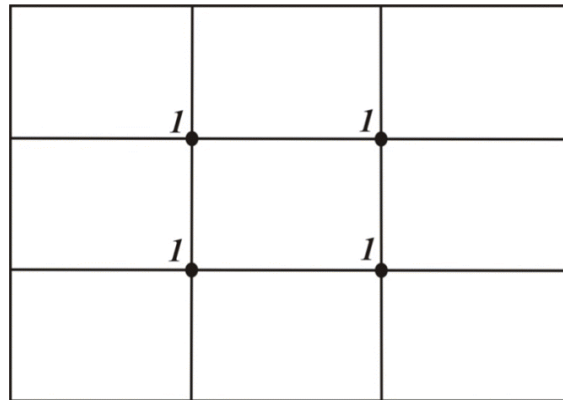


Fig. 5. The correct position in the frame of the photographed element

- sometimes is indicated that in the picture to exist a directive line, that orientates, conducts the view (river, road, alley, footpath, tree alignment etc.);
- very important is also the release, this being actually the moment of truth; the photographer's position at the moment of the release must be relaxed, stable (the legs straight, a bit distanced), holding the camera with both hands (at the DSLR's there is also the third point of holding – the forefront); pushing the releaser must not be suddenly, forced, but with calm, because if the push is too fast we might cause the camera to move and thus the picture may become blurry.

Dictionary

Aperture – the mechanism for controlling the quantity of light that passes through the lens of the camera; usually is made of metallic plates or hard plastic which forms an eyelet (pupil), which can open and close gradually as the photographer wishes (constrained by the light conditions from the scene). At each level of the aperture the quantity of the light that passes through the eyelet doubles in regard of the previous lower level. The classic scale of the aperture values is: 1/1.8; 1/2; 1/2.8; 1/4; 1/5.6; 1/8; 1/11; 1/16; 1/22; 1/32.

Area of depth (area of clarity) – the area between the interior and exterior limit of the optical axis of the lens, between which the photographed object appears in clarity. It may be adjusted with the help of the aperture (the area of clarity gets larger as the aperture values goes smaller). At the same time the area of depth is larger for wide lens and smaller for telephoto lens.

Depth of field – look for area of depth or area.

Detail – photographs of parts of natural or anthropogenic assembly, taken in order to highlight some particular characteristics. For this type of photography the light must usually fall perpendicular on the subject; also, the photographing direction must be frontal, many of the detail photographs actually being scientific. In some cases an element for dimension is needed to be placed near or on the subject.

Digital zoom – the possibility of the LCD screen of the digital camera to enlarge an image from the memory card.

DSLR (photo camera) – from Digital Single Lens Reflex – digital camera with viewfinder directly through the lens. The photo forms on the sensor instead of the classical film. Apart from all the advantages that a SLR presents, it offers the possibility of live view on the digital screen (some models only).

Exposure – combination between time exposure (T) and aperture (A). These parameters are chosen primarily considering the amount of light from the scene and the ISO sensitivity of the film/sensor. Equal values of exposure can be obtained from combinations between the values of T and A (for instance: $1/125$ s with $1/8$ = $1/60$ s with $1/11$ = $1/250$ s with $1/5.6$ etc.).

Focal distance – the most important characteristic of the lens. This is the distance (on the optical axis of the lens) between the optical centre and the focus. Depending on its ratio with the image format diagonal the lenses classify as: normal, wide and telephoto.

Focus – obtaining clarity on the chosen subject by pushing the releaser half way (when using AF – auto focus mode) or by easily rotating the focus ring of the lens (when using MF – manual focus mode). The obtained clarity is not characteristic to a fixed distance between the lens and the subject, but to an area in front of the lens (called clarity area or depth area).

Landscape – type of photography, frequently used in geography in which a place from nature is illustrated. It is recommended to capture as many plans as possible, aperture to be set at small values (for a higher depth), to have in forefront one or more elements of depth, to have the light coming from aside (morphologic landscape), or from the back of the photographer (industrial landscape, urban landscape etc.).

Macro – photographic type which represent images of subjects placed very close to the lens (less than 50 cm, frequently 1-5 cm). At some macro scientific photos (minerals, rocks) an element for dimension can be put close to the subject (usually a coin). The background usually must be simple and having a colour that is in contrast with the subject. Settings include low values of aperture in order to enlarge the clarity area, usually small at this type of photography.

Noise – is an undesirable by-product of

image capture that obscures the desired information. It consists in green, blue or red pixels in the case of digital photography. This is a consequence of capturing the unwanted radiation by the image sensor. It is more evident as the ISO value for the sensor is set higher and it appears especially in low light areas.

Normal lens – lens of which the focal distance has a value close to that of the diagonal of the image format of the camera the lens are attached to. For instance, in the case of the film cameras, at which the diagonal of the image format is 43.26 mm, the normal lens are the ones that have a focal distance between 40 and 60 mm. Normal lenses do not enlarge, nor do they shrink the photographed subjects, thus generating the smallest deformations.

Optical zoom – the ratio between the maximum and the minimum possible focal distance for a lens (in case it has a variable focal distance). It is expressed as 3 X, 5 X, 15 X etc.

Photo angle – or the angle of the photographing field. The area between the extreme radius that comes from the lens and which includes all the objects that will appear in the photo. The angle is large at wide lens, medium at normal lens and small at telephoto lens.

Photography dimensions – or resolution – is the photography dimensions expressed in pixels (length x height, for instance 3600 x 2400 pixels). Some brands, for simplification, give this parameter in megapixels (MP; 1 MP = 1000.000 pixels). For instance the resolution 3600 x 2400 pixels = 8 640 000 pixels = 8.64 MP.

Rule of thirds – a very important rule in photo compositions, especially when photographing landscapes, says that the line of the horizon must be positioned at a third part of the frame's height, no matter if the upper third or the lower third.

Sensitivity – the most important property of photo-sensitive materials, depending on which the other parameters are modified

(gradation, exposure latitude, granulation, frequency separation). It is measured in ISO units. Films may have small sensitivity (3, 6, 12, 25 ISO), medium (50, 100 ISO) or high (200, 400, 800, 1600, 3200, 6400 ISO).

Shutter - the mechanism of the exposure, the one that takes the photo. Is usually placed in the focal plan of the lens, right in front of the film or sensor, being made of small metal blades or plastic, perfectly opaque. The shutter opens, leaving the image coming from the lens to pass towards the photo-sensitive material or sensor and then close back again. The time while the shutter stays opened is called time exposure.

SLR (photo camera) – from Single Lens Reflect; photo camera that uses film, with viewfinder directly through the lens. It presents the advantage of coincidence between what you see through the lens and what comes up in the photo at the end. Others include the possibility of changing lenses, the possibility of seeing the level of clarity instantly on the subject etc.

Telephoto lens - lens with small angle of photo shooting and which can close-up, enlarge the subjects from a far distance, as a consequence of its large focal distance, precisely of the ratio between focal distance and the diagonal of the image format. For film cameras the focal distance for a telephoto lens must be greater than 60 mm.

The image format – the rectangular frame with which the darkroom ends towards the focal plan, which practically cuts the circular image that forms on the lens, leaving only the rectangular (the image that reaches to the film or sensor). The image

format also expresses the ratio between the length and the height of the photo. For instance for film and digital cameras the format is 3:2, for the computer screen (desktop) and classic TV is 4:3, while for the LCD monitors is 16:9.

Time exposure – the time (measured in seconds) by which the shutter stays opened, leaving the light coming from the subject to reach the sensor or film. It may be below or above 1. The classical scale of the time exposure is: 1, 1/2, 1/4, 1/8, 1/15, 1/30, 1/60, 1/125, 1/250, 1/500, 1/1000, 1/2000, 1/4000. At each level the time exposure gets halved compared with the immediately superior value. The time values below 1 are usually used in daylight or when using a flash bulb, while the above 1 values (2 s, 4 s, 8 s, 15 s, 30 s etc.) are used for night photography, in caves or poorly lighted rooms.

White balance – setting that may be made at the digital camera, concerning in adapting the sensor to the temperature of the colour of the source of light from the scene that we want to photograph. This is one of the advantages of digital photography compared to the film one. Depending on the brand, in the menu or on the body of the camera, the function is marked with WB from white balance.

Wide – look for Wide lens.

Wide lens – lens with large angle of photo shooting, as a consequence of its short focal distance, more precisely of the small ratio between the focal distance and the diagonal of the image format. In the case of film photo cameras, the focal distance for the wide lenses must be smaller than 40 mm.

References

1. Burian, P. K.; Caputo, R., (National Geographic), *Fotografia, ghid practic – Secretele unor fotografii reușite*, Ed. Egmont, 2003, București.
2. Cristea, E.; Iarovici, E., *Munții și fotografia*, Ed. Tehnică, 1980, București.
3. Dicu, Al., *Manualul fotografului amator*, Ed. Științifică, 1961, București.
4. Enczi, Z.; Richard, K., 2010, *Fotografia de natură cu aparatul foto digital*, Ed. Casa, Oradea.

5. Freeman, M., *La luce – Conoscere la fotografia digitale*, Ed. Logos, 2005, Modena, Italia.
 6. Freeman, M., *101 ponturi de bază în fotografia digitală*, Ed. Do Minor, 2008, București.
 7. Harman, D., *Ghid de fotografie digitală*, Ed. Polirom, 2009, Iai.
 8. Ielenicz, M., *Mijloace foto în Geografie*, Tipografia Universității din București, 1989.
 9. Novac, M., 1973, *Fotografia de la A la Z*, Ed. Tehnică, București.
 10. Săndulache, I., *Tehnica fotografierii. Aplicații în domeniul Geografiei*, Ed. Universitară, 2009, București.
 11. Săndulache, I., *Aparatul foto – un instrument util oricărui geograf*, Rev. „Terra”, LX/2010, 2010, București.
 12. Săndulache, I., *Curs de fotografie pentru studenții geografi*, Ed. Cetatea Doamnei, 2012, 2014, 2018, Piatra Neamț.
 13. Williams, Annabel, *Fotografia de portret – 99 de idei pentru tine, familie și prieteni*, 2010, Ed. Litera, București.
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