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Title: *Possibilities of infrared techniques application for environmental studies of the polar regions (Spitsbergen)*

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Innovative researches using thermovision increase possibilities and range of field researches. These techniques allow the non-invasive research of Arctic regions – on the strict environmental protection areas particularly. Using a thermal imaging camera makes possible the infrared measurements of selected natural and anthropogenic environment elements. Thermography allows to get pictures of infrared radiation (invisible for normal sight) so extends available measurements methods for observed objects and phenomena.

Thermovision camera gathers infrared radiation measurements that reaches camera's detector. Input signal is amplified and analyzed. Result is shown as thermal image. Each pixel of this image has his own temperature value, so the temperature scale is created. Object temperature value is counted on the basis of emissivity parameter of object's surface, current environment temperature, temperature and humidity of atmosphere and distance from camera to target.

All conditions necessary to take proper results are fulfilled if we talk about Spitsbergen region. This area has constant light conditions (or total lack of it), different emissivity of each particular object taken under analysis, good visibility (low water-vapour concentration in atmosphere), large and homogeneous surface areas, lack of intensive vegetation.

Study shows results of observations made on August, 2008 and July, 2012 on the southern part of Spitsbergen. Those infrared measurements concerned:

- 1) estimated thickness of deposits covering the moraine (erosion of glacial river on head moraine together with ice core of Werenskiöld Glacier; 2008 and 2012),
- 2) mixing of waters (flow of supraglacial waters into lake placed on the head of Werenskiöldbreen),
- 3) thermal waters outflow (Orvin Spring, 2008)
- 4) determining of number of little auks (Alle Alle) colonies (south hillside of Arikammen, Horsund near Polish Polar Station, 2012),
- 5) determining of permafrost thickness (2008),



6) “research infrastructure” – buildings of Polish Polar Station and “Baranówka” hus (2008, 2012).

Such studies will be applicable for natural environment monitoring of Svalbard Archipelago and other arctic environment.