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PORTABLE CAMERA THERMAL MONITORING

Identification Tool of Natural Disasters Risks Responsed to Local Climatic Effects

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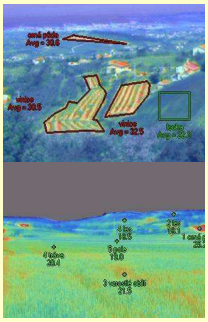
Local natural disaster risks can be connected with local climatic effects (LCE). Their origin reflects coupling of active surface form and its cover. The both spatial and temporal thermal variability of different active surfaces influences local climate as a whole.
The conditioning of a landscape as to long-term LCE action as to frequently occurred LCE involves reaction of an environment that exhibits as potential environmental disasters risks.
LCE origin is caused by natural, meteorological and anthropogenic factors. Numerous groups of LCE are related to the active surface temperature and the relief morphometry (wind speed, lower/higher daily/annual temperature variability, fog frequency, katabatic/anabatic wind flow, pool of cold air, slope thermal belt etc.). LCE are frequently put together with thermal and thermodynamic origin which could constitute potential risks of environmental consequences.
Portable camera for thermal monitoring gives exact data about spatial and temporal variability of non-uniform active surface. Particular knowledge of a local geographical condition and surface temperature regime allows to identify places with thermal and thermodynamic related LCE and consequently helps to mark out areas with natural disaster risks in the local scale.

STUDY CONCEPTION OF LOCAL NATURAL HAZARDS/RISKS RESPONSE TO THERMAL AND/OR THERMODYNAMIC LOCAL CLIMATIC EFFECTS

Surface temperature anomaly detection:
- portable thermal camera Fluke Ti55



surface temperature anomaly detection

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local climatic effect definition

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origin of potential local nature hazards/risk

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possible consequences

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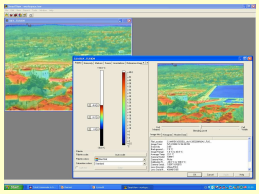
expected LCE impact/response in landscape

Surface temperature anomaly detection:
- portable thermal camera Fluke Ti55



Local thermal and/or thermodynamic climatic effect definition:
- thermal convection,
- local circulation,
- thermal inversion,
- pool of cold air,
- slope thermal belt.

→

Expected LCE impact/response in landscape:
- convective clouds
- abnormal erosion and/or landslide hazard
- frost hollow origin

→

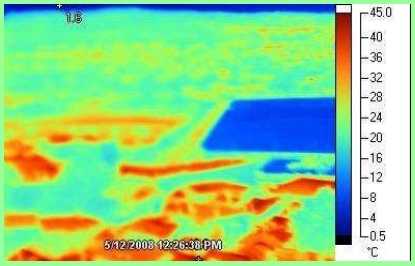
Possible consequences:
- risk of farmland degradation,
- risk of wildfire,
- risk of urban flash floods,
- long-term low air quality,
- degradation of human/vegetation health.

→

Origin of potential local nature hazards/risk:
- abnormal erosion and/or landslide hazard
- local urban precipitation and/or thunderstorm
- environment degradation

Local overheated urbanized areas and/or expressive local temperature differences → thermal convection → convective clouds → local urban precipitation and/or local thunderstorm → RISK OF URBAN FLASH FLOODS

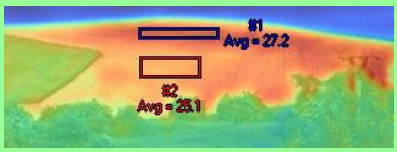
A-Innsbruck, 2006



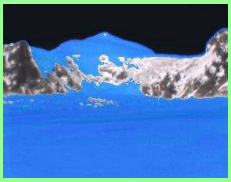
SI-Koper, 2008

Expressive surface temperature differences of a plowed soil on slopes → higher potential surface and/or stream soil erosion → abnormal erosion and/or landslide hazard → RISK OF FARMLAND DEGRADATION

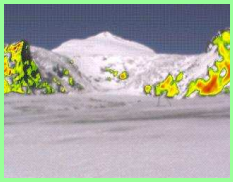
CZ-Southern Moravia, 2008



Surface temperature alarm: extreme temperature field differences, such us in glacier landscape and mountains environment, in the cultural landscape etc.



A-Pasterze glacier, 2008



CZ-Nízký Jeseník highland, 2008

Other possible applications

slope surface closed in down part with bad ventilated concave georelief form and covered with low/poor vegetation → **katabatic wind** → **pool of cold air** → **temperature inversion** → **systemic upset of diffusion condition, lower air quality** → **RISK OF HUMAN/VEGETATION HEALTH WORSEN**

extreme high surface temperature of vegetation (grassland,shrubbery → thermal stress of vegetation → systemic upset of vegetation health condition → dry up vegetation → **RISK OF WILDFIRE (SPONTANEOUS COMBUSTION)**
spatial expressive surface temperature differences of woodland → thermal stress of woods → up set of forest health condition → **RISK OF WOOD-DESTROYING AGENT ATTACK**

In the stage of an experiment that was proved, there is a way of spatially identifying potential places of their emergence based on the knowledge of the surface temperature field. As mentioned above in a few examples, some of them could be responsible for "waking up" real natural hazards/risks if other circumstances are also favorable. Their documentation will require long-term systematic measurement and observing in localities where probability of described phenomena and processes is very high. The authors appreciate the difficulties of a complex solution for the described problem.

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