To Whom It May Concern,
Transvalor S.A.,
Mougins, France
SoDa Service

Zvolen, Slovakia, 25th of April 2014

Proposal of research and theoretical backgrounds:

Modelling of spruce bark beetle population dynamics in the Tatra Mts. (Carpathians), using satellite derived solar radiation data.

Spruce bark beetle (*Ips typographus* L.) **[1][2]** can cause widespread damages during it´s outbreaks in spruce forests. Norway spruce (*Picea abies* (L.) H. Karst.) **[3]** is the most common tree species in Central Europe, especially in Slovakia, Czech republic, Austria and Germany.

The yearly development of spruce bark beetle depends on temperature and solar radiation. There is an existing model on the phenology (number of generations per year) of Spruce bark beetle, called PHENIPS **[4]**, and one of the basic input, among with maximum air temperature and mean air temperature, is the daily solar radiation in Wh/m^2.

We would like to model the number of generations per year and their onset (measured in ordinal date **[5]**) and we would like to compare it with tree mortality in different years of the outbreak. We want to model it´s outbreak dynamics from 1987 to 2013 (26 years) in the High Tatras **[6]**, because in that time span there were two bark beetle outbreaks in High Tatras, Slovakia (fore some pictures of an outbreak, see **[7]**).

The development of a bark beetle outbreak has its own phases, therefore it is important to model all the years of an outbreak. For example, if there is a global warming, such a long time period (more than 20 years) could revealed a shift in number of generations of spruce bark beetle per year and that could explain some big outbreaks - but that is just a scientific hypothesis.

If the results of our modelling will show statistical significance in relationship between spruce bark beetle population dynamics and spruce tree mortality, than we would like to publish the results in scientific journals citing your webpage **[8]** as a source of data. To get published in some scientific journals can take several months to more than one year. If so, we would let you know.

Best regards,
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References:
[1] http://en.wikipedia.org/wiki/European_spruce_bark_beetle

[2] WERMELINGER B. 2004. Ecology and management of the spruce bark beetle Ips typographus - a review of recent research. Forest ecology and management, 202: 67-82.
[3] http://en.wikipedia.org/wiki/Picea_abies
[4] BAIER, P., PENNERSTORFER, J., SCHOPF, A. 2007. PHENIPS—A comprehensive phenology model of *Ips typographus* (L.) (Col., Scolytinae) as a tool for hazard rating of bark beetle infestation. Forest Ecology and Management, 249: 171-186.
[5] http://en.wikipedia.org/wiki/Ordinal_date
[6] https://maps.google.com/?ll=49.241783,20.150557&spn=0.008756,0.01929&t=h&z=16
[7] https://www.google.at/search?q=lykozrut+vysoke+tatry&client=opera&hs=pJk&channel=suggest&tbm=isch&tbo=u&source=univ&sa=X&ei=ZWhOU7PWB-GN4wTK_YD4Dw&ved=0CCUQsAQ&biw=1280&bih=683
[8] http://www.soda-is.com/eng/index.html