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Science for the Carpathians (S4C)

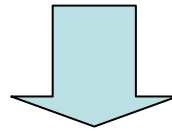
Climate change in the Carpathians: Current knowledge and suggestions for future research



Brussels, 6-7.02.2012

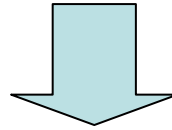
Climate

Long-term data series, mean values, seasonal and interannual variability, data from various vertical zones



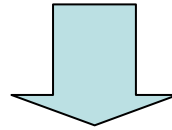
Climate change

Achieving a new state of dynamic equilibrium



Impact

of climate variability/change on land use/cover, water resources, biodiversity, tourism etc.



Adaptation

to the new situation

1. Current knowledge

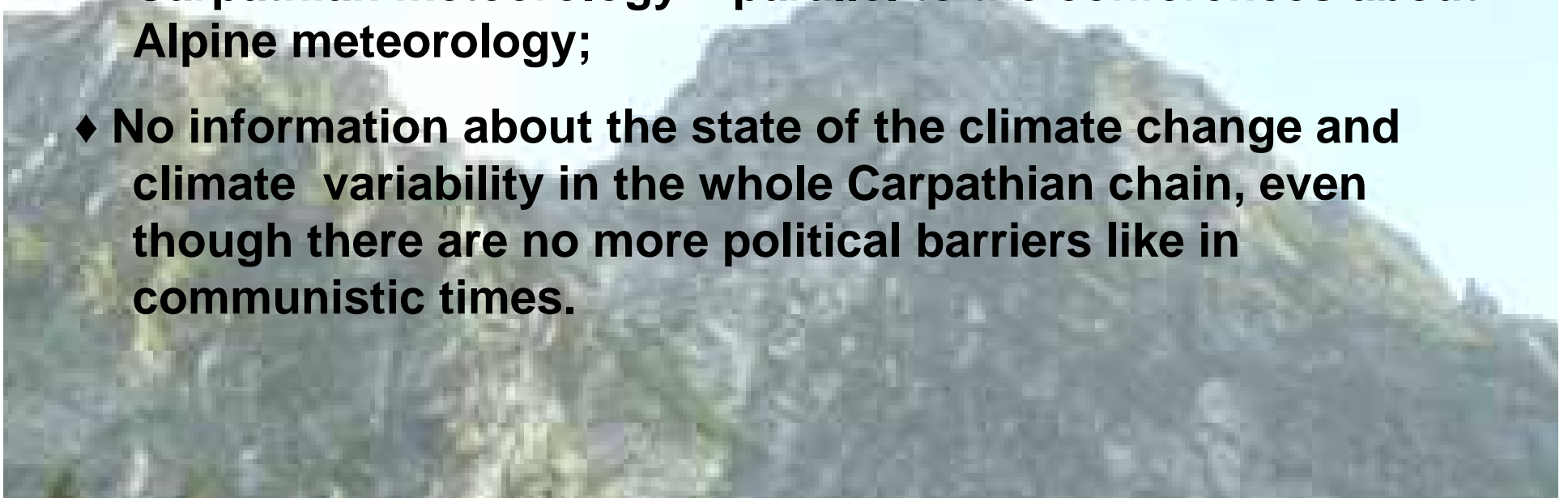
- ◆ S4C, Science for the Carpathians, *Research Agenda for the Carpathians 2010–2015. Integrating Nature and Society Towards Sustainability*, Kozak J., Björnson Gurung A. & Ostapowicz K. (eds.), Kraków, 2011:

”The climate change, with special focus on temperature, precipitation patterns and the occurrence of extreme events have not been sufficiently assessed at the pan-Carpathian scale.”



Why?

- ◆ **Long-term series (longer than 50-60 years) available only from a few stations; most stations located in the valleys, foothill areas etc.;**
- ◆ **Most studies realized only in a local and national scale; small bilateral projects, e.g. TATREX, Poland-Czechoslovakia, a part of ALPEX;**
- ◆ **Results presented e.g. during several conferences on Carpathian meteorology – parallel to the conferences about Alpine meteorology;**
- ◆ **No information about the state of the climate change and climate variability in the whole Carpathian chain, even though there are no more political barriers like in communistic times.**



Current knowledge versus impact and adaptation studies:

- ◆ **In order to talk about impact of climate changes and adaptation to it, we must first know much more about climate changes themselves.**
- ◆ **Some changes observed e.g. in water resources may be first of all an effect of land use changes, not necessarily mainly or exclusively an effect of climate changes.**



2. Suggestions for the future research

- ◆ S4C, Science for the Carpathians, *Research Agenda for the Carpathians 2010 – 2015. Integrating Nature and Society Towards Sustainability*, Kozak J., Björnson Gurung A. & Ostapowicz K. (eds.), Kraków, 2011.

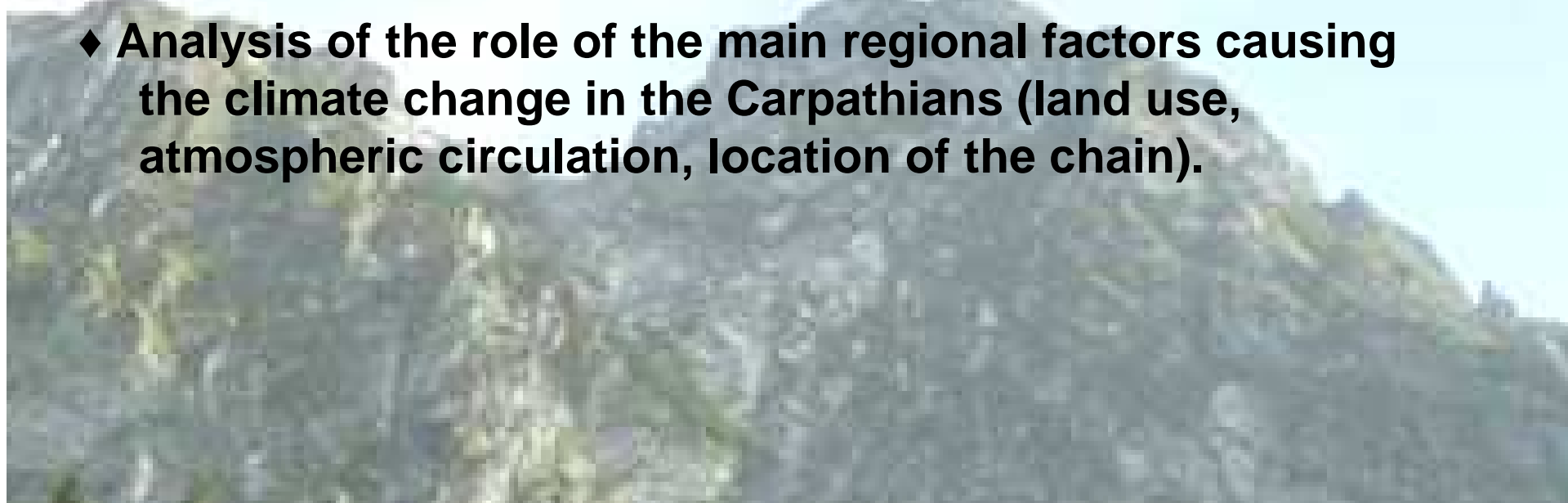
”Future climate research requires better international collaboration, common protocols and downscaling to make predictions reliable and thus relevant for planners and mountain dwellers.”



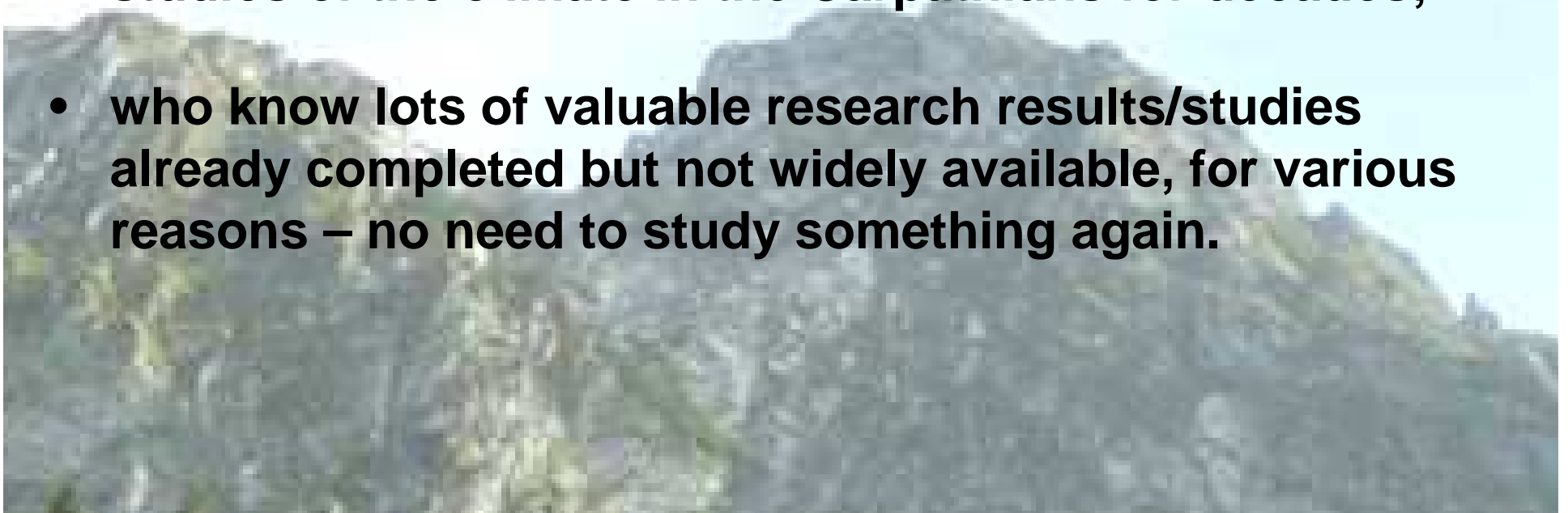
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- ◆ **Studies of the climate variability and changes in various vertical zones of the Carpathians (the summit parts do not react in the same way as the foothills);**

 - ◆ **Changes of the Carpathians' climate in different temporal scales:**
 - **last millennium (proxy data);**
 - **last 100-200 years (instrumental data);**
 - **after 1950 (many stations established);**

 - ◆ **Analysis of the role of the main regional factors causing the climate change in the Carpathians (land use, atmospheric circulation, location of the chain).**

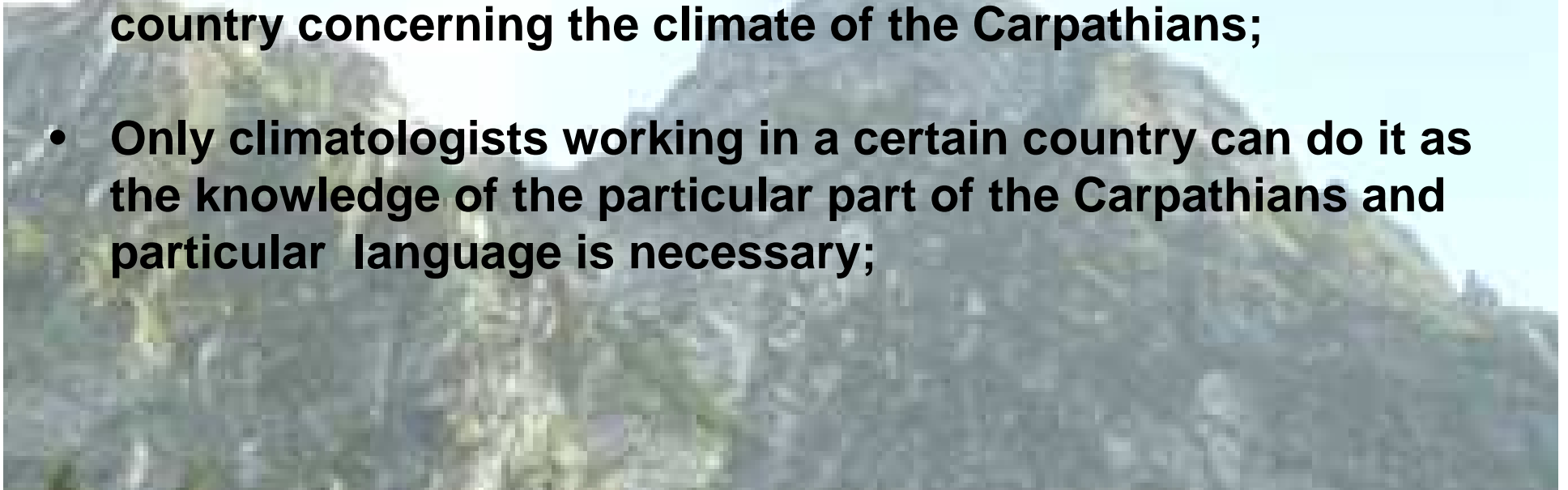


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- ◆ It is necessary to establish an international **group** consisting of climatologists:
 - representing all countries in which the Carpathians are located,
 - working not only in meteorological national services but first of all in research institutions e.g. universities or academies of sciences which have been conducting studies of the climate in the Carpathians for decades;
 - who know lots of valuable research results/studies already completed but not widely available, for various reasons – no need to study something again.



◆ **Aim:**

- **Each country prepares a report showing the results, data used and available resources concerning the climate of the Carpathians spatial and temporal variability in that country, for as long period as possible;**
- **The reports are based on already published materials and only reviewed data/results are used;**
- **Each report contains the list of publications from the certain country concerning the climate of the Carpathians;**
- **Only climatologists working in a certain country can do it as the knowledge of the particular part of the Carpathians and particular language is necessary;**



The reports should be **published**:

- in English as a monograph, available for the public free of charge (Internet, open access);
- national chapters available also in national languages.

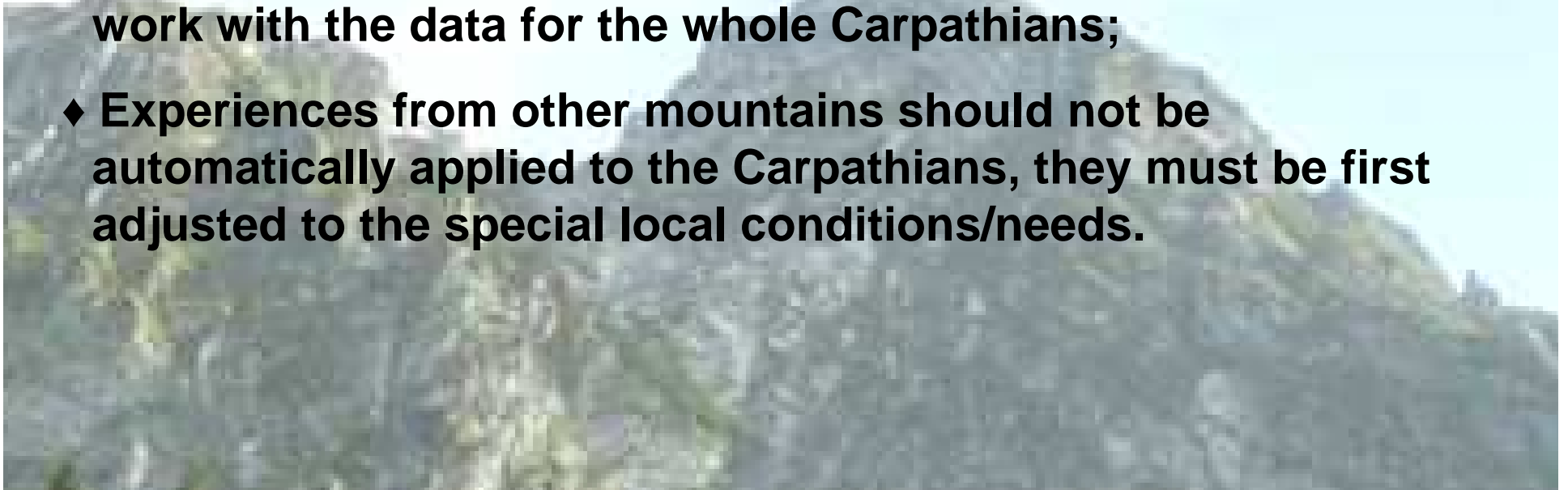
Such reports would be a **good basis** for:

- ◆ the evaluation of the present state of research;
 - ◆ establishment of international thematic groups of experts;
 - ◆ defining the necessary research actions.
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3. Suggested research: Assumptions and barriers

The research should be based on several assumptions, e.g.:

- ◆ Any interpolation procedure for the data concerning the mountain environment must be based on careful downscaling, as there are numerous local peculiarities;
- ◆ The representativeness of "model areas": justified in the mountains???
- ◆ Only international research groups, including climatologists well familiar with certain part of the Carpathians, should work with the data for the whole Carpathians;
- ◆ Experiences from other mountains should not be automatically applied to the Carpathians, they must be first adjusted to the special local conditions/needs.



Basic **problems** in the Carpathian climate research:

- ◆ Difficulties and costs of accessing meteorological data in particular countries (not accessible free of charge);
- ◆ Too little number of meteorological stations in the high/summit parts of the mountains in order to have sufficient data for modelling purposes – a need to establish such stations;
- ◆ No special funds reserved for the research of the climate change and its impacts in the Carpathians, now the project proposals are often rejected e.g. as too local; suggestion: each Carpathian country should have such funds;
- ◆ International research cooperation among the Carpathian countries is not sufficiently promoted and supported financially.





Thank you for your attention!

