Interactions between the Alps and its adjacent regions and metropolises: Research questions and needs for action

Issues from the ForumAlpinum 2010 (6.-9. October 2010 in Munich) addressed to the scientific community and to the Alpine Convention and the Alpine Space Programme

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In the context of the current EU-wide discussion of macro-regions and spatial policy, the ForumAlpinum 2010 themed "Metropolises and 'their' Alps" explored the relationship between the Alps and large cities along the Alpine Arc from scientific and political perspectives (programme overview attached). Some main issues of the ForumAlpinum are summarised from both perspective: upcoming research questions addressing science, and needs for action addressing policy. The formulated research questions and needs for action are considered as a discussion input for the Alpine Convention and the EU Alpine Space Programme. The larger contexts of the following suggestions are the highland-lowland interactions (Alps – Metropolises) regarding future development and cooperation in and between these areas. The proposed topics have been collected by the moderators of plenary sessions and workshops and by representatives of ISCAR and the Alpine Convention. They are grouped following the topics of the plenary sessions and the concluding round table.

Interactions metropolises – Alps

Inputs: Axel Borsdorf, Patrick Kupper, Manfred Perlik

Research questions (addressed to science)

1. Evaluate the role of **migration** between metropolises and Alps and viceversa (different kind of migration and their impacts):

1a) In which way **increasing residents from urban areas** (main residences, secondary residences) will change population structure and territorial know-how in mountain communiteis / areas.

1b) Comparative case studies in different countries concerning the **role and the social impacts of new immigrants** to Alpine communities, especially the phenomena of **poor immigrants** (as examples in Austria and French).

1c) Metropolises near the Alps loose population to the agglomerations around: assess the **role of these agglomerations for the development of the alpine valleys** regarding urban sprawl, spatial planning, mutual services of centres and rural areas (criteria to identify and describe urbanization).

2. Analyse **expectations from metropolitan regions** to rural mountain areas and respective (convergent/divergent) services of rural mountain areas.
3. Assess the change of **Alpine landscape aesthetics** and its **perception** by urban populations
4. In view of the ongoing process of globalization, national differences are likely to diminish, while local and regional differentiation will increase. The Alps are likely to become less nationalized and more regionalised area: Identify the effects of metropolitan areas near the Alps on **differences among alpine regions**.
5. **Assessment of the impact** of main **policies concerning Alpine economies**: a) agricultural policies (including subsidies as imaginary solution for rural areas); b) tourist policies (projects for future perspective of rural areas); c) protected area policies (future perspectives of parks and protected areas).
6. Humanities (especially history) use to concentrate on reserach topics within national contexts. For providing a differenciated basement to discussions concerning transnational cooperations / conventionsincluding interactions with lowland, a shift in reserach from national to **transnational Alpine history** is needed (starting in the 18th century).
7. Wich economic risks or opportunities in a long term perspective would create a shift from traditional economic activities (as agrculture, tourism) to an **economy based on residence, leisure and real estate commerce**.

Needs for action (addressed to policy)

1. Develop creative and integrative approach how to deal with **alpine fallows** (because alpine fallows are a challenge and a chance for new developments) and especially concepts for shrinkage, social erosion, depopulation, and "software" development (mobility management, social cooperation and integration, etc.)
2. Make alpine regions attractive for people to **live and work** there but avoiding urban sprawl and long commuting distances
3. Identify and define **"alpine specifics"** as assets and chances for sustainable development and the reasons for a **"macro-region" Alps**
4. Develop **functional planning** and management approaches for issues where territorial approaches do not fit.
5. Formulate and implement **participatory planning** and management approaches in order to involve urban dwellers as well as Alpine dwellers in the discussion on the determination of the development of the Alps
6. Overcome polarisation betweeen attractive productive urban areas and less attractive consumptive mountain areas by developing **new strategies für (macro)regional development**
7. Analyse causes for **migration to and within the the Alps**: amenity-/lifestyle migration, immigrants from third states (-> integration policies), returning emigrants, labour, etc

8. The diversification in the production of Alpine goods will be a major driving force. Develop strategies for **regionally differenciated planning & development**: centres, peri-urbanisation, posturban/suburban areas, urbanised areas along transport connection, tourism.

Climate change: from mitigation to adaptation. A common concern for the Alps and adjacent metropolises

Inputs: Heinz Veit, Marion Damm, Stefan Lechtenböhmer, Wolfgang Pfefferkorn, Bruno Abegg

Research questions (addressed to science)

1. Comparison of **energy needs** resp. real **CO^2-output** in urban and rural areas in order to set priorities for CO^2 reduction
2. **Low Carbon development** in metroplises and rural areas: Evaluation of chances for joint implementation
3. Economic assessment of benefits by **carbon neutral** developments and concepts
4. Use metropolitan ecosystems for early detection of effects from climate **warming**
5. How can we avoid negative **impacts of climate response measures** (=mitigation and adaptation measures) on nature and environment as well as on society? How do climate response measures have to be designed to be in line with the principles of sustainable development?
6. How can we improve **"climate governance"** in order to implement a sustainable climate policy?
7. Definition of balancing boundaries for greenhouse gas emission assessment (territories, sectors, products)
8. The prospects of a **renewable energy** autonomy plus potential exports from the Alps (as a combination of high efficiency and consequent utilisation of RES (?) potentials)
9. Potentials for **e-mobility** within the Alpine region.
10. The Alpine region as a key element in the development of a Pan-European **renewable electricity system**.
11. Optimisation of the net **sink function** of soils.
12. Introducing **gradual changes in Alpine economy** in order to set it on a long-term sustainable track (such changes might be: converting of extensive cattle breeding, mass tourism, expansion of settlement, road and airport infrastructure… to more sustainable and higher value added activities)
13. Provision of **climate neutral goods** and services to the Alpine population and tourists and potentially for exports.
14. Can our present focus on fossil energy and related problems be overcome by the new focus on **energy services?** Is the concept, which is based on the highest technology available, realistic for the the whole alpine region?
15. What would be the real consequences of **the new energy paradigm**, Alps-Metropolises? How could it be managed?
16. With **global warming** the intensity of precipitation events is likely to increase: What are the implications for detecting the triggering mechanisms of mass movements and flood generation?
17. Analyse **highland – lowland relations in water management** under climate and global change szenarios (changes in water availability, runoff or seasonal distribution at a regional scale).

18. Metropolises – Alps: **bioclimatology** under climate change szenarios and possible consequences for migration, recreation, tourism etc.

Needs for action (addressed to policy)

1. Enhance **communication** (processes) on different levels addressing specifically media, practitioners (risk dialog), policy makers (results) and households (best available technologies)
2. **Low carbon development** in metroplises and rural areas: Evaluation of chances for joint implementation
3. Develop blueprints for **carbon neutral** cities
4. Develop concrete strategies how the **transport distances** in private car be reduced as much as possible (regarding locals and visitors)
5. Develop and implement approaches to use social assets and capacities to develop **climate neutral** areas.
6. Use functional approaches for **CO^2 neutral studies** and projects.
7. Create a network of experts and stakeholders with the objective **to enhance CO^2 neutrality and renewable energies** (energy mix for/in the Alps: approaches and strategies) Remark: Functional approach for CO2 neutral studies and projects is crucial and goes much beyond the territorial approach
8. Implement **smart climate response measures** (= measures, which do not have negative impacts on nature and society) in different sectors like energy, mobility, spatial planning, tourism, agriculture, forestry, risk management etc. Proposed actions can be taken from the different compacts from the CIPRA project cc.alps: http://www.cipra.org/en/cc.alps/results-and-products/compacts/
   Remark: In the so called compacts, CIPRA has listed a wide range of political needs for action in the different sectors with regard to climate response measures. This needs for action are not listed here, they can be taken directly from the different compacts).
9. Improve **climate governance** in order to reduce the gap between knowledge and action.
10. The setting up **of low-cost early warning systems** of natural hazards can reduce the vulnerability of and the damage to settlements, traffic infrastructures and tourists.
11. Areas in permafrost regions or along rivers that have been identified to be **potentially dangerous** by scientific investigations should be excluded for the use of buildings or other infrastructures by law in all alpine regions.

Biodiversity benefits for and from the Alps

Inputs: Roland Psenner, Jean-Jaques Brun, Eva-Maria Koch/Thomas Spiegelberger, Chris Walzer, Leo Füreder, Axel Borsdorf, Claudia Drexler, Urs Gantner

Research questions (addressed to science)

1. Quantification of the **economic value** of ecosystem services (e.g. biodiversity, air, drinking water) -> Develop an **economy of ecosystem services** (B@B = business and biodiversity)
2. Identify most important question concerning **ecological networks** in/to the Alps
3. Metropolises: hotspots or deserts of biodiversity?
4. The role of biodiversity for **sustainable energy** production and carbon storage
5. Selection and use of **biodiversity indicators** for the assessment of an "sustainable ecosystem quality concept" in mountain landscapes

6. What are possible consequences of a **decreasing biodiversity** in the Alps? What changes result within the Alps and what are the consequences for the Alpine forelands?
7. What would be a **minimal monitoring system of biodiversity** and of other relevant ecosystem factors and functions in order to detect and understand changes in the Alpine biodiversity and to take measures in time
8. Highlight relevant research needs concerning the main challenges for **European mountain agriculture**

Needs for action (addressed to policy)

1. Institutional and financial support allowing the building up and the maintenance of a long-term **monitoring** system in the Alps
2. Establish new sites for Long-Term Ecological Research (**LTER**) in the Alps (part of the global LTER-programme)
3. Develop concepts of "**biodiversity friendly practices**" for grassland and forest ecosystem management adapted to the different cultural landscapes of the Alps
4. New strategies for assuring **benefits of mountain agriculture for biodiversity**:
   - Transform mountain agriculture policy into landscape policy (subsidise goals not measures)
   - Reorganise EU subsidy system -> support for small structures
5. Integrate **rural areas as valuable complementary areas** to agglomerations into economic concepts
6. Develop concepts for "**low energy agriculture**"
7. Create a working group "mountain agriculture" within the Steering Committee for Agricultural Research (SCAR) for the European Union for further developing **research cooperation on mountain agriculture**
8. Enhance **acceptance for dynamic processes** (in both direction of growth and shrinking), for wilderness and for the coexistence of nature and human history

Georisks and geo-resources

Inputs: Hans-Peter Bunge, Ludwig Braun, Christoph Mayer, Reinhard Hüttl, Karl Schwaiger

Research questions (addressed to science)

1. Deformation state and **seismicity pattern in the alpine foreland** is nearly unknown. The key question is: what maximum earthquakes might happen within a short (100 years) interval? Answering this question is most relevant for estimating hazard/risk regarding geothermal energy (induced seismicity).
2. Identification of **high earthquake hazard /risk areas** in alpine environment.
3. Micro-zonation of high risk areas for reliable ground motion models and evaluation of reliable error estimation through **simulation of different earthquake scenarios**.
4. Induced seismicity and its impact: **develop smart injection strategies**
5. Identification of the **potential of geothermal energy** on regional and local level.
6. Still large uncertainty exists about the spatial extent of **permafrost in the Alps**. How can the crucial areas of potential sediment sources be identified?

7. The high water yields of rapidly melting glaciers can **mobilize large amounts of glacial deposits** from the pro-glacial areas. What are the implications on sedimentation in artificial reservoirs, and how can the bedload be transferred back to the river beds downstream?
8. Analyse the importance of the **Alpine water tower** for the surrounding regions.
9. How far the increase in damaged properties and fatalities is caused by **less natural catastrophes during the last 100 years** („disaster gap"?)

Needs for action (addressed to policy)

Seismic risk

Seismic risk is underestimated at least in some regions in the alpine chain.

1. An Alps wide **harmonization (or coordination) of monitoring, hazard mapping and building codes** is urgently needed
2. Information that is needed by local authorities regarding seismic risk has to be identified.

Use of geothermal energy from deep reservoirs

In order to cope with global warming and following the Kyoto protocol (reduction of CO^2), the use of geothermal energy from deep reservoirs in the Alps and in the alpine foreland is an option for environment friendly future energy supply and an economic perspective for municipalities:

3. The necessity of **more knowledge of the geothermal potential**, the understanding of geothermal relevant processes and interacting reservoir usage, and development strategies for individual sites were identified
4. **Legislative framework** for geothermal energy has to be adapted and improved.
5. Harmonization **of regulations for approval of geothermal exploitation.**
6. Develop strategies for a better acceptance by the population: A **better communication about geothermal development** in the Alpine region requires contributions from municipalities, geological survey, and mostly local research institutes in alliance with technology developing institutes. For example, the Metropolitan region Munich as location for excellent research can be significantly strengthened in the field geothermal technology to guide industry to economic success under broad public acceptance
7. Geothermal industry has to be supported in order to follow a learning curve to economic provision of geothermal energy. **Good practice must be shared** in order to approach a best practice procedure for reliable constructing and effective operating geothermal plants.
8. **Induced seismicity in the frame of the development of geothermal reservoirs** is leading to following key challenges:
   - major internationally linked research are currently ongoing and are expected to result in an upgraded state of the art regarding induced microseismicity within the next few years
   - the scientific community is expected to deliver an improved physical understanding responsible for the occurrence of induced microseismic events of notable (M>2) magnitude
   - based on such a quantitative model the issue of public acceptance can be addressed more clearly while maximum transparence to the public is needed
   - Sesimic impact of geothermal activity has to be monitored.

Power-generating technologies

9. Comparison of **chances and risks** of different power-generating technologies.

Hazards and risks

10. Concenting **loss of porperty** policy making has to become aware, that
    - in the last 30 years major damage and loss of property was caused mainly by flooding and storms
    - the losses caused by meteorological effects will increase in future, and
    - geo-risks might be underestimated as they are rare but when they happen the losses are huge.
11. **Economic assessments of risks** in a larger sense are needed
12. The mapping of **hazard zones** along traffic axes can profit from the advancement of **remote sensing techniques** such as TerraSAR-X / TanDEM-X, and cooperation between scientific institutions and the Ministries of the respective States (such as the Bavarian Ministry of the Environment and Public Health) is strongly encouraged
13. Apart from high-tech methods, great advances have been made in the setting up of **low-cost early warning systems of natural hazards**. Such systems can reduce the vulnerability of and the damage to settlements, traffic infrastructures and tourists.
14. **Areas in permafrost regions or along rivers** that have been identified to be potentially dangerous by scientific investigations should be excluded for the use of buildings or other infrastructures by law in all alpine regions.
15. Install appropriate installations for measuring **transport of sediments**

Potential future water requests from surrounding regions

16. Develop **management tools** (rules, agreements, compensations, instruments) to meet potential future water requests from the surrounding regions,
17. Develop appropriate approaches how to deal with additional water demands from downstream in periods of **low flows and water scarcity**
18. Develop approaches to manage the water of **exsting reservoirs**

Information exchange

19. Interregional **platform for information exchange** between local/regional authorities and science is needed (best channels for exchanging information and accomplish strategies deduced by scientific results)

The Alpine Space macro-region: towards a common vision?

Research questions (addressed to science)

1. Study of the **historically grown structural pre-conditions** in a future macro-region Alpine space.
2. Analyse the **history of the Alps in the context of highland – lowland relations** froma social and cultulural perspective.
3. Analyse **the role of national states as political authorities in the perimeter of a future macro-rgion Alpine space** during the last 200 years regarding the question, how the political authority is changig actually and what territorial arrangements concerning teh Alps are increasing (macro-region, areas influenced by metropolisis, heterogeneous puzzle of autonomous regions, etc.)

4. Identify and analyse the **bridge function of the Alps.**
5. Analyse the geo-economic, geopolitical and the geo-ecological **functions of the Alps.**
6. Analysis of **potential of industry** outside / inside the Alpine perimeter.

Needs for action (addressed to policy)

1. Develop **spatial models of functional regions** (Alpine Space project).
   Two basic models have been discussed:
   - 4 transalpine axes: Ljubljana – Vienna; Verona – Bolzano – Munich; Milano – Zurich, Lyon – Grenoble - Torino.
   - 3 economically differenciated regions: "growth – belts" at the northern and southern border of the Alps, the transit corridors, remaining areas with shrinking economy.
2. Develop an **action plan for the implementation of a common strategy within Alpine Space**: 1. Institutionalization – 2. Allocation of financial means – 3. Identification of approach and priorities. Profit from experiences made in metropolitan regions like Munich or Zurich. Start Alpine Space projects with partners form Alpine regions and metropolises concerning common issues.
3. Assess gaps in the **consistency between the protocols of the Alpine Convention**, in order to develop common projects and actions with towns.
4. Find ways of **application of international law** that refers to parts of nations only.
7. Analyse good practices and describe the **success factors for cooperation projects**: Trigger of cooperation between metropolises and the Alpine regions are large projects like the Olympic winter games (Munich/Bavarian Alps) or traffic infrastructures (Munich – Verona).
8. Clarify the **role of the European Commission** in a macro-region process (facilitator, mediator; no new finances, regulations and institutions)
9. **Develop approaches to treat common challenges and chances in Alpine Space**, regarding among others the following aspects:
   - consider functionality and not territoriality
   - complementarily and a common responsibility for the common "Alps"
   - bottom – up projects that focus on the demand of the metropolitan regions
   - support of the EU policies
   - concentration on action plan (start with little steps and projects)
   - common infrastructures (e.g. rail)
   - common institution to coordinate policies
10. Discuss optional **advantages of a common (macro-)region within the Alpine Convention**, such as:
    - Participation
    - Justice in allocation
    - Cooperation with and among centres
    - Manage common issues:
        - destination Alps (tourism)
        - transport and mobility (infrastructure and organization)
        - general economic development
        - services for the public
        - green infrastructure
        - migration
        - research/universities/education
        - common resources which are an asset for the surroundings as water
    - Alliance of metropolises around and in the Alps for example against the privatization of water-rights or services for the public