Climate Change and Natural Hazards:

The Time Factor

Trausti Valsson and Ragnar Sigbjörnsson

University of Iceland

Introduction – The IPCC Reports

Of central interest are two realisations outlined in the IPCC reports:

1. *By global warming many occurrences in nature will be much more violent*

2. *The frequency of such events will increase*

Introduction - Uncertainty in Predictions

- *Today some changes in climate appear to be happening faster than of late*
- *The UN Intergovernmental Panel of Climate Change presents predictions*
- *IPCC has reduced its earlier prediction on sea level rise down to 40-60 cm/century*
- *This is a clear indicator that the uncertainty in these predictions is great*

Aspects in how the future will evolve

IPCC interprets the changes in climate as the overriding aspect

Other aspects include human factors like:

- *1) Economical aspects*
- *2) Technological development and*
- *3) Social changes*

Time factor

- *The time factor is important due to increasing occurrence rate following global warming*

Hence, the time scale of natural events may appear to be "compressed" - i.e. long recurrence intervals tend to shorten

- *The human activity time scale is much shorter than the climatic time scale*

Time scales

1) *Socio-cultural time scale*
2) *Technological time scale*
3) *Economic time scale*
4) *Political time scale*

A Case Study on Sea Level Rise

- *Sea level rise is because of the heat expansion of oceans and melting of glaciers*
- *In some areas the land is rising or subsiding on the same time*
- *Decreasing loading due to melting glaciers leads to land rising (e.g. Vatnajökull/Iceland)*
- *A case study on sea level rise in Iceland:*

  Main result: The (economic) risk is governed by present hazard

Modelling and Scenarios

- Scenario 1 - *Technology develops faster than climate change.*
- Scenario 2 - *Social change develops faster than climate change*
- Scenario 3 - *Climate change develops faster than technological and social change*

A Lack of Understanding

- *The modes of reasoning in most climate impact reports reveals a lack of understanding that there may be other factors than climate change governing the future of Man*

- *Most of all, they seem not to take into consideration that the mechanism of the different time factors is of key importance for the understanding of how the future may evolve.*

Can man cope with upcoming extremes?

- *Societal risk due to increase in natural hazards that comes with the climate change is of most consequence for those occurrences that happen in the present*
- *An important fact about these current catastrophes is that they are, as a rule, confined to rather limited areas*
- *There may be few vacant spaces available close to the disaster areas*

Main results (1)

- Societal risk due to increase in natural hazards that comes with the climate change is *of most consequence for those occurrences that happen in the present*
- *Societal risk* due to natural hazards will most probably *decrease with time*

Main results (2)

- *Reduced value of societal systems with age means less social risk*
- *Longer time scales give more time for preparation, adaptation and planning to account for increased hazards*
- *The needed wealth of nations and other basic factors required to be able to cope with these problems, are developing at a fast pace*

Discussion

- *Studies on natural hazards emphasise how future intensification of weather processes will result in increased natural threats*
- *This present study, on the other hand, indicates that this does not necessarily apply to man-made hazards*
- *There may be ample time for proactive measures to render many of these future occurring events less harmful than expected*

Final Conclusion

- *Gloomy predictions are being made on the impact of climate change. Such predictions do not sufficiently consider other factors of influence, and the time factor*
- *This has been the case with the IPCC–reports on climate change impacts*
- *The result is that these reports are possibly drafting too pessimistic picture of the future*