

**Science, policy decision making and public participation – the challenge of climate change at the coast.**

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Climate is changing, and we can only understand the causes of a minor part of the change, if we do not use the emission of radiatively active substances into the atmosphere as a key driver. Climate - that is the statistics of the “weather” in the atmosphere, in the groundwater, in the sea etc. Change means that these statistics are changing. It means we have less often cold winters, but not that we have no cold winters, for instance.

Even if significant changes cannot be comprehended without the action of greenhouse gases, it is not so that all changes have, or may have a causal link to the emission of greenhouse gases. Some are within the normal variations of climate; others, such the heavily increased storm surge heights in Hamburg, have their dominant origin in modifications of the estuary. In short: climate change is a serious issue, but not the only one.

In the presentation, the general situation of climate change - which variables, how strong, which changes are inconsistent with natural variability and need “external” explanation, and what are such possible external drivers – are discussed. First for the present situation, then for the expectation we have for the future. Among the presently changing variables, which need a reference to greenhouse gases, are all temperature-related variables. For storms we have no such signal; for heavy rainfall events, the situation is still under examination, and if the present rise in sea level is really beyond what has previously been recorded, is also still under debate. For the future, we expect a clear greenhouse-gas related increase in temperature and related variables, in sea level, and in heavy rainfall events, but not necessarily in storminess.

The discussion and the policy decision process is about the question of what to do about the present changes and the expected future changes. We name the situation “post-normal”, because the issue is serious, needs urgent decisions, which would involve many resources, and is embedded in ethical world views. In this situation, science can only to a limited extent help in the decision process, namely by analyzing what is going on, and by describing which consequences which policy decision would go along with. The decision itself is a political matter of balancing societal values, perceptions of risk and preferences of outcomes.

This is a challenging situation for scientists, who find themselves often enough in a position that they should provide truth from which the decisions would result – as some head of governments like to say “there is no alternative”. We have set up our “Norddeutsches Klimabüro” of the Helmholtz Institut für Küstenforschung in Geesthacht. This Klimabüro is a “farmshop” for our regional clients, many of them in coastal defense but also off-shore activities. It supports social actors (authorities, civil society, public at large, media, and economic actors) in better understanding perspectives and

options. The Klimabüro is also feedback means to find out if our insights and products have any bearing for practical issues.

In the presentation, a number of products of the Norddeutsches Klimabüro will be presented, namely the IPCC-like “Hamburger Klimabericht” (which covers also the Schleswig Holstein. Westküste), and the internet-tools “Norddeutscher Klimaatlas, the “Norddeutscher Klimamonitor” and “Küstenschutzbedarf”.