



HSMS03 The impact of climate change on the critical weather conditions at Schiphol airport (Impact)

Projectleider:	Dhr. dr.ir. A.J.M. Jacobs		
Instituut:	Royal Netherlands Meteorological Institute (KNMI)		
Email:	Albert.Jacobs@knmi.nl		
Consortiumpartners:	Amsterdam Airport Schiphol, Air Traffic Control the Netherlands, Wageningen University, Delft University of Technology		
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Schiphol requirements

Schiphol operations is very sensitive to critical weather conditions such as fog and low clouds, intense precipitation, heavy winds, and severe lightning. Flight safety and efficiency requires reliable weather information on local scales. Due to changes in our climate, we expect that the variability of the airport weather and the frequency and intensity of extreme weather events will change as well, but a precise quantification is lacking. In this project we aim to quantify and better understand how climate change affects the weather conditions at the airport, and we will use this knowledge to improve the quality of our weather forecasts.

What we already know

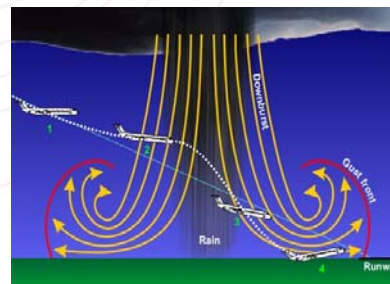
Present day climate models show that extreme weather events, such as summer rain showers and periods of heat and drought, become more intense. But, our climate models do not provide spatial differentiation in climate change within the Netherlands and changes in extremes are highly uncertain. Shortcomings are due to a coarse resolution of the model, a poor physical description of the land-atmosphere interaction, and the limited predictability of local events.



Early morning fog at Schiphol airport (Photo: Peter de Vries (KNMI)).

What we will investigate

In this project we will use the newly developed high-resolution (1-2 km) weather analysis and forecast model **Harmonie**, to determine the effect of global climate change on the weather parameters and the scales that are relevant for Schiphol operation. By selected case-studies we will demonstrate the ability of Harmonie to determine local weather forecasts for daily operations, such as the occurrence of fog in relation to land properties, intense rainfall and local winds related to heavy showers, and the formation of low clouds. The performance of the model will be validated against local airport observations.



A rapid change in wind speed and/or direction poses a threat to airplanes during take-off and landing (downburst).

Contribution to adaptation strategies

In Impact we demonstrate how the Harmonie model can be used as dynamical downscaling tool, to study the effect of future climate large scale conditions, produced by climate models, on the local climate at Schiphol airport and the effect thereof on the airport operation. Results from Impact will contribute to determine which adaptation strategies are most effective to make the airport operation "Climate Proof".