

Urban Climate analysis of Freiburg - An integral assessment approach

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The city Freiburg revises the zoning plan. The question from the authorities is, which areas can under climatic and air pollution point of view accounted or not for the construction of new industrial/trade areas.

In order to receive a data basis for the description of present climatic and air pollution situation, measurements (Thermal mapping, surface measuring program, SF6-experiments) and model simulations (thermal bioclimate mapping, cold air drainage flow simulations, Ventilation analysis, air pollution stress analysis) have been carried out.

For the assessment of potential areas for urbanization the ecological risk analysis have been applied. The impairment of an area in relation to microclimate changes arises by:

- a) the intensity, Range and direction of the effect
- b) of the sensitivity and priority of the surfaces concerned in relation to a certain effect of the project.

For the determination of sensitivity became the probability use of the areas by the humans (estimated from the land use), the human-biometeorological thermal index (PET) and the air pollution stress conditions have been taken into account. The value of the protection property "human" was set throughout as high, so that in this regard no differentiation was necessary.

It is fact, that after the urbanisation of an open space their characteristics (a.e. energy budget, ventilation, air pollution) are changed. To what extent surrounding surfaces are concerned, depends on it, whether the wind these characteristics into these neighbouring surfaces transports. Concerning the human bioclimate a distinction in day and night situation was made, since the flow conditions on sunny days differ clearly.

In order to be able to assess the influence of a future planned area on neighbouring surfaces, their effect was linked on the small climate with the sensitivity concerned of the surface. Exponential fading away of the effects was set as a function of the distance to the evaluation surface. The spatial analysis have been made in a resolution of 50 m * 50 m.

This procedure allows the estimation for the climatic value possible of the potential area surfaces and has been applied to all surfaces. It represents a tool for the classification of possible construction areas in the context of the master plan of a city.