

Bavarian research & innovation



Bavarian Research Organisation Elevated UV Radiation
in Bavaria – Consequences and Recommendations

RESEARCH FOR PEOPLE AND THE ENVIRONMENT: UV RADIATION IN BAVARIA

Prediction of UV levels – sun protection for crops – the origins of environmental toxins – prevention of skin cancer. These and other topics are studied by the Bavarian Research Organisation: Elevated UV Radiation in Bavaria – Consequences and Recommendations (Bayerischer Forschungsverbund: Erhöhte UV-Strahlung in Bayern – Folgen und Maßnahmen), BayForUV. Particular attention is being paid to Bavaria's topographic, climatic and ecological features. Over the last three decades, the levels of ultraviolet (UV) radiation have increased around the world. This rise is directly associated with the depletion of the ozone layer. A group of Bavarian scientists founded the BayForUV Research Organisation in order to search for interdisciplinary answers to the following questions:



- How high is the present level of UV exposure for people and the environment in Bavaria?
- How will the UV exposure for people and the environment develop in the future?
- What consequences does UV radiation have for human health?
- Are effects on the productivity and health of plants in agriculture and horticulture to be expected?
- How does increased UV radiation affect ecological processes?
- What recommendations can be derived for responsible and appropriate action in politics, administration and industry?
- And finally: How can the general public protect themselves from the possible hazards of increased UV radiation?

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The ASCARATIS system measures UV radiation, weighted according to its capacity to produce sunburn – here in the skiing region of Mount Zugspitze.



Assessment of the radiation damage to Bavarian crops provides the basis for detailed analysis in the laboratory.



"Sunburn" on grapes – what processes does UV radiation cause in plants?

RESEARCH TOPICS:

BayForUV's scientific work is divided into four project areas:

- Measurement and modelling of UV radiation
- Consequences of UV radiation for plant cultivation
- Consequences of UV radiation for ecosystems
- Consequences of UV radiation for human health.

Measurement and prediction

The **Measurement and Modelling** project area determines the current UV radiation level and the meteorological parameters that affect its intensity. The data are used to produce forecasts of UV radiation on a regional basis. UV forecasts could, for instance, become an element in the daily weather report, and could include specific recommendations for appropriate behaviour.

The analysis of consequences

The **Consequences for Ecosystems** project area investigates chemical and biochemical reactions that can be triggered in the environment by UV radiation. This includes

the forecasting of ground-level ozone levels and of other photo-oxidants (summer smog), as well as UV-dependent decomposition of environmental chemicals. Biologically oriented projects are analysing the effect of increased UV radiation on native freshwater fish as well as on microorganisms on forest trees.

The Consequences for Plant Cultivation

project area is examining the sensitivity of crops to UV radiation and how efficiently they can protect themselves against increased UV radiation. For example, increased levels of "sunburn" has been seen on grapes over the last 10 years, and this has led to up to 50% crop failure. The causes of the damage are being researched through a comparison of vine varieties, in order to produce recommendations for vine cultivation and for future strain selection.

The Consequences for Human Health

project area has developed and constructed a device that records UV radiation

levels at various exposure angles. The values measured in this way are being used to simulate the UV exposure of the human body in a variety of everyday situations. This will permit early warning of UV exposure. Dermatologists are investigating whether, and to what extent, the risk of UV-induced skin cancer can be reduced through specific vitamins.

Research partners

- Bayerische Landesanstalt für Bodenkultur und Pflanzenbau (Bavarian State Research Centre for Agronomy), Munich/Freising
- Bayerische Landesanstalt für Weinbau und Gartenbau (Bavarian State Institute for Viticulture and Horticulture, LWG), Veitshöchheim
- GSF – Forschungszentrum für Umwelt und Gesundheit GmbH (National Research Centre for Environment and Health), Neuherberg
- Atmospheric Environmental Research Division (IMK4) of the Institut für Meteorologie und Klimaforschung (Institute for Meteorology and Climate Research), FZK (the Karlsruhe Research Centre), Garmisch-Partenkirchen
- Institut für Wasserchemie und Chemische Balneologie (Institute of Hydrochemistry and Chemical Balneology, IWC) at the Technical University of Munich
- Institut und Poliklinik für Arbeits- und Umweltmedizin (Institute and Outpatient Clinic for Occupational and Environmental Medicine) of the University of Munich
- Klinik und Poliklinik für Dermatologie und Allergologie (Clinic for Dermatology and Allergy Medicine) at the University of Munich
- Chair of Botany II: Ecophysiology and Vegetation Ecology, Julius-von-Sachs Institute of Biological Sciences at the University of Würzburg
- Meteorological Institute at the University of Munich
- Hohenpeißenberg Meteorological Observatory, German Weather Service, Hohenpeißenberg.