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**Bavarian Forest Ecosystem Monitoring Program:
a useful tool to analyze the drought 2003 and its effects on forests**

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Abstract

The Bavarian Forest Ecosystem Monitoring Stations Programme was build up as a result of the discussions within the theme of forest dieback. As a part of the European intensive monitoring program (Level II) its primary purpose is the continuous observation and documentation of complex physical/chemical and biological processes in forest ecosystems under present and future environmental conditions, and its impacts on the ecosystems. Factors of influence are measured within the forest stands at the same locations where the effects are observed. The range of the Bavarian programme exceeds the minimum requirements of Level II clearly. Therefore it encompasses the complete set of environmental factors and state variables. All of the 22 Bavarian plots contain automatically meteorological observations. Soilwater content is measured directly at 6 locations in different layers using TDR technology. This enables an observation and evaluation of the effects of the last year drought and heat on forest sites in Bavaria. The most important results of the last year will be summarized briefly.

Extreme temperatures were measured last summer even in the large forest areas marked by a more balanced climate than in open land. Average air temperature during the vegetation period 2003 (May until August) exceeds the normal values up to 5 K. Also the global radiation was clearly increased, while the total amount of annual precipitation is nearly 40 % lesser than the long term average, much lesser in the vegetation period. By the measurements of the soil water content using the TDR technology it was stated that the soil water reservoir emptied rapidly at many forest sites. Physically deterministic water regime modelling figured out a complete consumption of plant-available water contents at many plots until August and September 2003. Therefore trees had to reduce the transpiration substantially. Since the last year was simultaneous a full mast year at many stands, the drought 2003 met the forests particularly hard. In the context of the phenological observations drought damage announced from middle of July up to October from almost all plots in Bavaria. Green, dry leaves and

needles on the forest floor were particularly remarkable. Measurements of litter fall confirm the prematurely throw off of leaves. By weekly diameter measurements it became evident that radial growth decreases in 2003 up to 40 per cent in comparison to the previous year. In addition branches of the spruces were strongly underdeveloped, fruits were partly diminished and the needle yellowing of spruce were more frequently than in the previous years. Deciduous trees and pine showed less strong reactions.