

D1.2 Heat stress indices over Europe for current climate conditions and for future conditions based on climate model simulations.

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Abstract

Heat stress constitutes an important threat for European workers with potential major impacts on workers' health and productivity. 21st century climate projections indicate a continuous and accelerated warming on a global scale with corresponding consequences on the intensity and frequency of heat stress conditions on regional and local scales. In this deliverable we present state-of-the-art and European-scale climate change projections of a heat stress index: the wet bulb globe temperature (WBGT) with two implementations 1) in the shade (obtained from temperature and humidity) and 2) in the sun (including additionally solar radiation and wind speed). The WBGT has been selected as the official heat stress index within HEAT-SHIELD (see Deliverable 1.1). Heat stress projections are obtained by combining the comprehensive EURO-CORDEX regional climate model ensemble with a bias correction technique. We find that summer mean and maximum WBGT (shade and sun) will increase by 1.5-4.5°C until the end of the century over the entire European continent. The magnitude of this increase considerably depends on the emission scenario assumed. The number of days with high heat stress risk for unacclimatized workers active in the sun will reach more than 35 summer days in large parts of southern and central Europe. The Mediterranean coast and Spain will experience the highest frequency of high heat stress risk for unacclimatized people working in the shade or acclimatized workers in the sun. Model uncertainty can be large, but a strong qualitative agreement on an increased heat stress risk is obtained. Adapting European industries to these projected changes will likely be required in order to prevent major economic consequences.