

Twenty one pore water chemistry profiles were obtained for a range of inorganic solutes from the Chalk unsaturated zone in or adjacent to Black Wood, a 2.4 km² mature beech wood in southern England. The depth sampled was normally 10 m, but some boreholes were shallower and one was deeper (30 m). Towards the centre of the wood, average pore water concentrations were : Cl (17-25 mg l⁻¹), SO₄ (20-40 mg l⁻¹) and NO₃-N (5-10 mg l⁻¹). In small clearings within the wood, concentrations of Cl (12-20 mg l⁻¹) and SO₄ (27-36 mg l⁻¹) were somewhat lower but the average concentration of nitrate-N was higher (16 mg l⁻¹). Pore water chloride and nitrate concentrations under a small area of ash were lower than under the beech. There was a significant increase in the concentration of a number of solutes, especially Cl, Na, Mg and SO₄, close to the exposed western edge of Black Wood. This 'edge effect' decreased exponentially with a half distance of about 9 m. The effect was less consistent at the more sheltered eastern edge. Average pore water concentrations of up to 310 mg l⁻¹ Cl and 312 mg l⁻¹ SO₄ were found at the western edge. Paradoxically, close to the western edge pore water nitrate concentrations were often very low, frequently less than 1 mg l⁻¹ NO₃-N. Using the parameters derived from a simple exponential model of the Black Wood data, calculations suggested that the edge effect would lead to significantly enhanced Cl and SO₄ pore water concentrations in forests of a few hectares, a size typical of many of those currently being planted. The consistently lower moisture content of the Chalk close to the forest edges suggested that groundwater recharge may have been lower there