The hazards associated with lightning are common in Australia. In some instances, the effects of lightning-initiated bushfires are so extreme that they are classified as natural disasters. Knowledge about geographical distribution and seasonal variability of lightning activity for the Australian continent are vital for developing adequate lightning protection measures.

A review of thunderstorm and lightning observations in Australia, with emphasis on studies of their spatial distribution and frequency over the Australian continent, is presented. Long-term thunderday records, lightning data obtained by ground-based lightning detection instruments CIGRE-500 and CGR3 and by NASA satellite-based instruments OTD and LIS have been analyzed to develop maps of total lightning flash density (i.e. cloud-to-ground and intracloud) and of ground flash density. The peak lightning occurrence is in the north-western part of the Australian continent with total lightning flash density values up to about 35 km$^{-2}$yr$^{-1}$. Ground flash density values vary from over 6 km3$^{-2}$yr$^{-1}$ in the northern parts of Australia to about 1 km$^{-2}$yr$^{-1}$ and below in the southern parts. There are significant seasonal and yearly variations in the frequency of thunderdays. In this presentation, spatial variability of thunderstorm and lightning activity in Australia will be described in detail using the developed thunder-day map and lightning ground flash density map.