Electron precipitation by wave-particle interactions is a major loss process for the Earth’s radiation belts. Precipitation has been linked to rapid reductions in the trapped electron flux on timescales of a few hours, to changes in the chemistry and temperature of the atmosphere from the top down, and to different types of aurora. Here we review briefly some of the basic theory behind the diffusion of electrons into the loss cone by wave-particle interactions and present examples of electron loss due to lightning, VLF transmitters, whistler mode hiss and chorus waves and electromagnetic ion cyclotron waves. We show examples of electron diffusion by chorus and ECH waves and discuss why upper band chorus waves are now regarded as the dominant waves responsible for the diffuse aurora. We discuss the importance of electron diffusion into the drift and bounce loss cone in the southern hemisphere, and present new results from the low altitude POES satellites to test whether rapid flux drop-outs that are observed in the radiation belts during magnetic storms and fast solar wind streams could be due to electron precipitation. We discuss the implications of these observations for the wave scattering process, and the need to measure electron precipitation with better angular and energy resolution using low altitude satellites.