The evolution of the Quaternary Period, or “How the Pleistocene got so big and the Holocene got so small”

Students introduced to the Quaternary and its two epochs, the Holocene and Pleistocene, have good reason to ask why anyone would divide 2.5 million years into two parts, one about 10,000 years (or 0.01 million years) and the other 2.49 million years? That's less than 1% vs. more than 99%!

The best answer is “Because we didn't know what we were doing (back in the 1800s)”. This page tries to explain in more detail.

In 1837, the famous geologist Louis Agassiz proposed that there had been “an ice age” (presumably one ice age). In 1839, the famous geologist Charles Lyell defined the word “Pleistocene” on the basis of paleobiological changes relative to the Holocene. Thus, in the mid-1800s, it made sense to see the Quaternary as two epochs, the earlier an ice age and the later a less-icy age. These were the Pleistocene and the Holocene. Job done! - or so it seemed.

By the late 1800s, geologists roaming the landscape saw evidence that glaciation had been episodic – that there had not been one ice age but instead four (or so they thought). In North America they named these four glacial episodes, from earliest to latest, the Nebraskan, Kansan, Illinoisan, and Wisconsinan. Now the last interglacial (the Holocene) was only perhaps an eighth of the Quaternary, which probably seemed like a radical thought at the time.

By the 1950s, Earth scientists had the capability to drill into the sediments of the seafloor. These sediments house a much more complete record of glacial and climatic history, because the deposits of later cycles simply settled from seawater onto those of older cycles, rather than being deposited by glaciers that bulldozed the older deposits away. The resulting record showed about fifty glacial cycles in the Pleistocene. This record was divided into interglacial and glacial stages called “Marine Isotope Stages” that were counted back from the present.

In this system, the Holocene became MIS 1 and was recognized as just one, and the most recent, of 100 isotope stages in the Pleistocene.