The Central American Volcanic Arc (CAVA) has generated numerous Plinian eruptions along his 1200 km extension in the past. The best-preserved archive of this volcanism is found as ash layers in the marine sediments downwind from the volcanic sources on the Pacific floor. Numerous ash layers up to 8 Ma old, which occur in ODP and DSDP cores of Legs 66, 67, 84 and 202, probably originated in Central America and southern Mexico. We have chosen 145 ash layers and conducted 2300 glass shards analyses with Electron microprobe yielding compositions ranging from basaltic andesite to rhyolite and trachyte. Felsic ashes can be divided into seven compositional groups by means of silica and potassium contents. Correlations between marine ashes and on-land tephas are constrained by petrographical and stratigraphical criteria, major element geochemistry of glasses and minerals, and trace element data from LA-ICP-MS analyses. Using the systematic along-arc variations of trace-element characteristics (Zr/Nb, Ba/La, Ce/Yb, La/Yb and Ba/Zr) provides source areas of the ash layers distributed along the entire CAVA, as well as at the Southern Mexican Arc. Besides first detailed provenance analysis we are able to 1) establish a complete tephrostratigraphy of the Quaternary for Central America, 2) use correlation to field tephas in combination with sedimentation rates to constrain ages of Quaternary tephra successions from land, 3) recognize temporal variations in composition within the involved volcanic source areas, 4) built up a data base for IODP cruise 334 (CRISP).