The observation by the High Resolution Fly's Eye (HiRes) of a break in the cosmic ray energy spectrum at approximately 60 EeV is evidence that the highest energy particles bombarding the Earth are extragalactic in origin and protonic in composition. Direct evidence for a proton-dominated composition would lend further support to this interpretation, as would the observation of a transition from (heavy) galactic to (light) extragalactic cosmic rays at lower energies. A second spectral feature, the "ankle" at 4 EeV may be indicative of this galactic to extragalactic transition or it may further strengthen the model in which the end of the cosmic ray spectrum is shaped by interactions with the cosmic microwave background. In this talk, I will report the results of studies of cosmic ray composition via analysis of the depth of airshower maximum, for airshower events collected by the HiRes observatory. The data are consistent with a predominantly protonic composition of cosmic rays at energies above 1.6 EeV, when interpreted via the QGSJET01 and QGSJET-II high-energy hadronic interaction simulations. The HiRes measurements constrain models in which the galactic-to-extragalactic transition is the cause of the energy spectrum "ankle" at 4 EeV.