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Recently, wide band measurements of the electric field near a lightning flash have been obtained by a balloon-borne electric field sonde or Esonde. The data from the Esonde can be combined with simultaneous Lightning Mapping Array (LMA) measurements of VHF pulses emitted during lightning breakdown processes to estimate the charge transport associated with lightning. In this paper, we further enhance the techniques we have developed to process Esonde data by taking better account of instrument rotation, and by computing the local horizontal electric field, not just the lightning induced electric field change. Using these techniques, we analyze lightning charge transport for a thunderstorm which occurred on August 18, 2004, near Langmuir Laboratory, New Mexico. The analysis yields the three-dimensional current generator structure of the thunderstorm. (Received September 03, 2009)