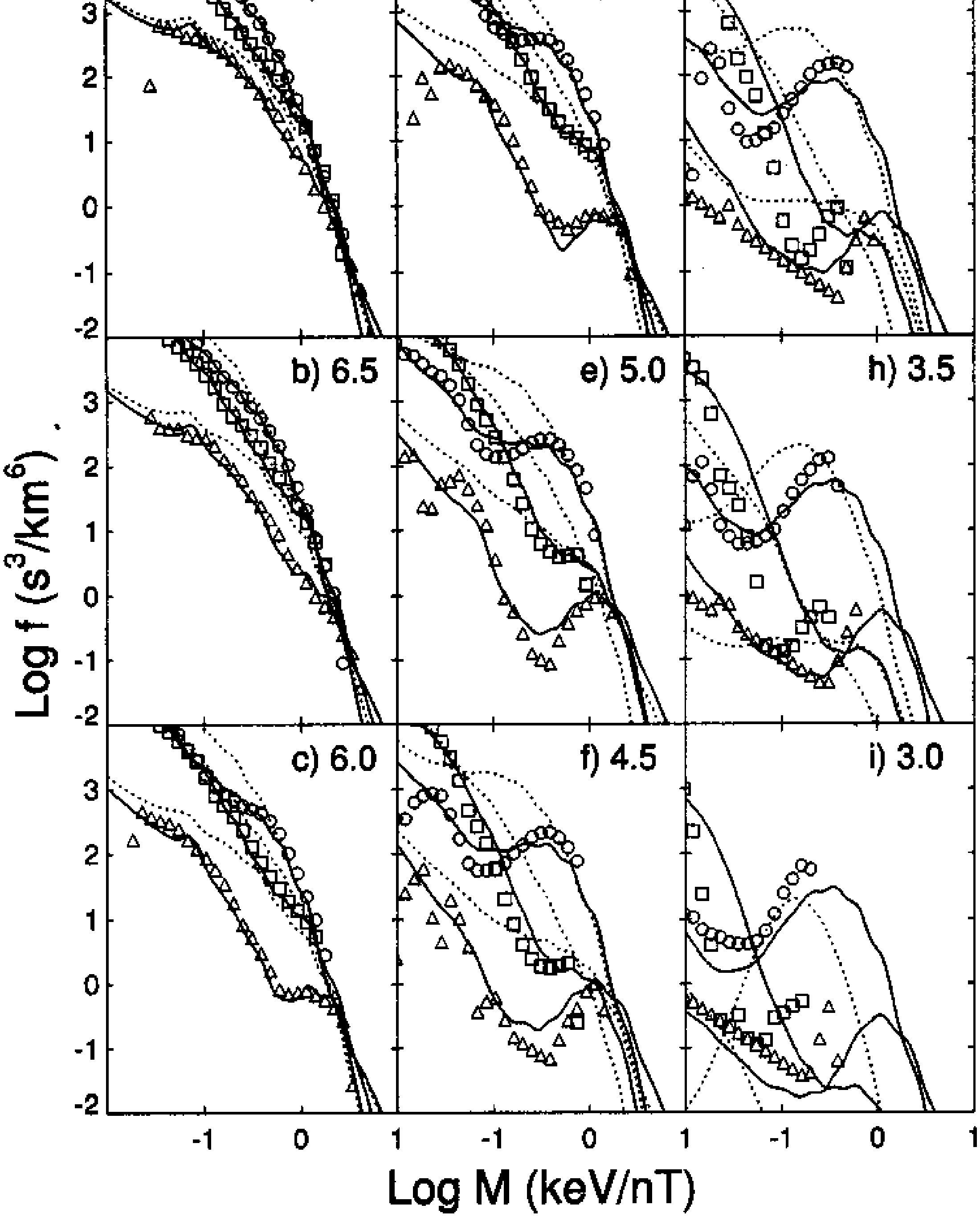

Figure 5. Spectra taken at selected L shells through the data (symbols: circle H^+, square He^+, and triangle He^{++}), reference fit of paper 1 (dashed lines) and fit 6 (solid lines).

Summary

We have increased the sophistication of the resonant diffusion model to incorporate most of the ring current energy region and found a solution that is finally able to describe the data to within (a geometrically averaged) 72%, where the error is defined,

$$\mathrm{Err} = 1 - \log^{-1}(\sqrt{\langle\chi^2\rangle}) \qquad (20)$$

This is a marked improvement over the standard model of paper 1. It is the frequency breakpoint that enables us to model the enhanced diffusion seen at 0.5 keV/nT in the proton data, while the radial gradient enables us to model the enhanced diffusion seen below L=4. We consider this a remarkable success of the resonant diffusion model, pushed to the limit of its applicability. We have argued in section 3, that electric fields appear to modify the spectral and radial form of the diffusion coefficient and in this section we fit the parameters of this semiempirical coefficient. Now we attempt to justify the values of these parameters.

5. Discussion

Internal Source

Our best fit with the modified diffusion coefficient finds that what appears to be an internal, ionospheric source dominates out to approximately L_0=6, the L shell "breakpoint," where the external, solar wind source becomes dominant. If the fluctuations in the ionosphere were independent of latitude, they would map to the magnetosphere (assuming field lines are equipotentials) with an azimuthal $\Delta E^2 \propto L^{-2}$ de-