ning at some particular magnetic moment, altitude and all local times [*Sheldon*, 1993]. Above a sharply defined energy threshold, which increases with L, convection ceases to be important for transport since particles cannot reach that L shell from higher L shells (e.g., from the plasmasheet). This is the high-energy analog of the plasmapause, also called the Alfvén layer. Above this boundary we can use our azimuthally symmetric diffusion model. The peak in the spectrum at $L<3$ maps to the deepest particle penetration, which occurs primarily on the dusk side of the magnetosphere. Since this behavior requires a LT-dependent model to be described adequately, we will defer its discussion to a subsequent paper that will treat electric field convection. Here we will avoid fitting this region, as indicated by the outlined region of Plate 1.

Model Overprediction

More puzzling is the consistent underprediction by orders of magnitude of f below $L\sim3$, even up to 300 keV where presumably the radial diffusion model works best. The other major disagreement for all three species lies between 0.1–1 keV/nT, (the blue region in Plate 1) where the model overpredicts f by 1–2 orders of magnitude. Radial profiles (vertical cuts of Plate 1 at constant M) of the data and the fit in Figure 11 show that the deviation at low L is due

Likewise the overprediction in the "blue spot" is due to a slop mismatch; a convex model profile compared to a straight or conca data profile seen in Figures 11e and 11f. By comparing the relati rates in the model, we found that the steep slope occurred whenev the loss rates exceeded the rapidly falling diffusion rate. Simp changing the amplitude of the diffusion coefficient only moves t boundary between the model's over/underprediction of the pha space density without improving the fit. Thus any attempt mere to scale the fit cannot resolve either of these regions of disagreeme since their profiles and relative rates are too different.

The deviations between model predictions and data outlin above were a persistent feature of these fits, although all fits r turned diffusion coefficient amplitudes, C_E, (Table 3) within t envelope of previously reported values [*West et al.*, 1981]. R stricting the domain to only hydrogen or helium (Plate 2 column and Fits 2 and 4) did not resolve this difficulty. The only regi that could be consistently fit by the model, was the $E>30$ ke $L>4$ area (Fit 3), which had been discussed by SSF (Fit C). Th region however, does not test the model so much as the bounda condition, since a diffusion dominated regime merely duplicates adiabatically energized source spectrum. Only where loss rates a comparable to diffusion rates is the amplitude strongly constrain by the fit [*Spjeldvik*, 1977].

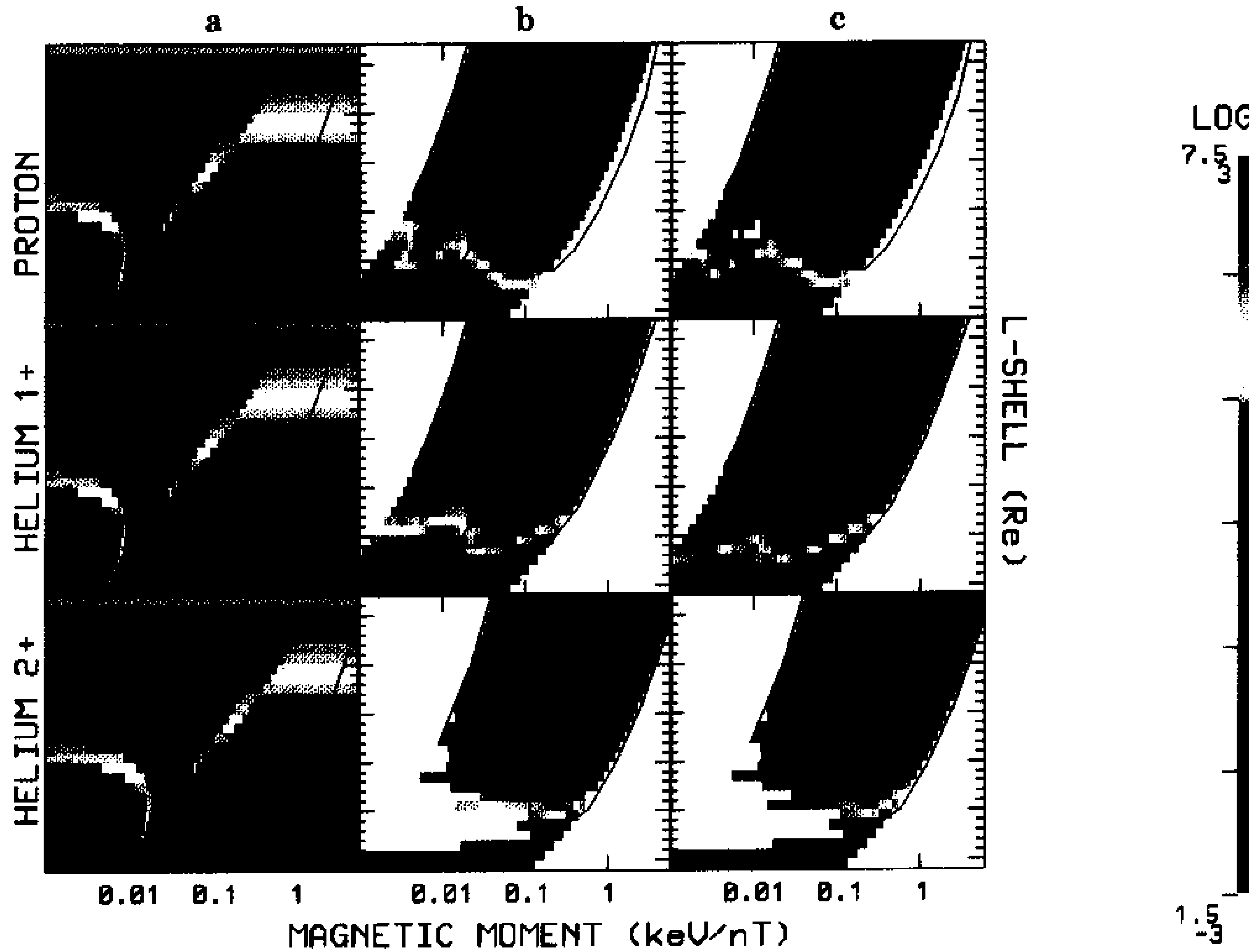

Plate 2. Column 1 displays highest L shell accessible to convecting ions starting from this point in M-L space, from L=1.5 (blue) to L=7.5 (red). Columns 2 and 3 display data/model ratios for reference model with domain restricted to H^+ and with T_e >1 eV, respectively. Color bar as in Plate 1.