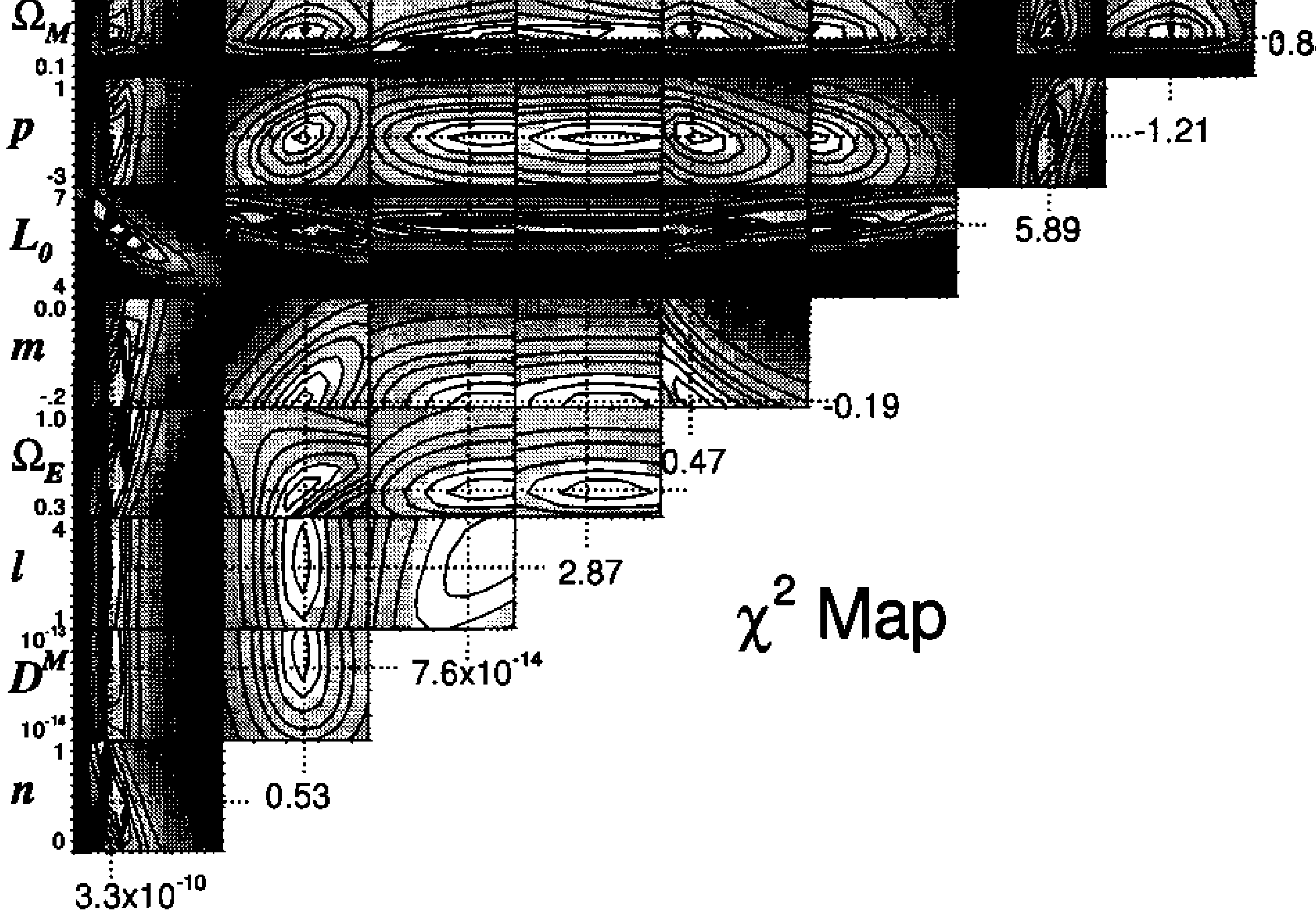

Figure 6. Two parameter contour plots of χ^2 space for fit 6 showing local minima. Ranges for variables are as follows: $10^{-11}<D^E<10^{-10}$, $0<n<1$, $0.3<\Omega_E<1$, $-0.2<m<0.0$, $4<L_0<7$, $-3<p<1$, $10^{-14}<D^M<10^{-13}$, $1<l<4$, and $0.1<\Omega_M<2.1$. Intensities of $\langle\chi^2\rangle$ range from 0.055(white)–0.115(black).

pendence because of the greater divergence of high-latitude magnetic field lines [*Mozer*, 1970]. Instead, we found a radial dependence of approximately $L^{-7.21}$ for the deduced fluctuation power, which appears to imply the existence of a latitudinal gradient in the ionosphere, or perhaps shielding of the ionospheric fields from the magnetosphere, or both.

Ionospheric electric field gradients. The ring current shielding mechanism of *Vasyliunas* [1972; *Gonzales et al.*, 1983] also can operate in reverse, shielding the outer magnetosphere from an internal ionospheric source. This is consistent with the existence of quasi-stationary magnetospheric electric fields as determined by whistler duct motion [*Rash et al.*, 1986; *Carpenter*, 1978], and these fields were found to have an approximate L^{-4} dependence. Although ring current shielding has a finite time constant, at least short-term partial shielding during substorms has been reported [*Gonzales et al.*, 1983; *Fejer et al.*, 1990a; *Fejer et al.*, 1990b]. This would suggest that at least some of the magnetospheric electric field gradient may be due to field gradients in the ionosphere. If the energy source of the electric fluctuations were the low-latitude ionospheric dynamo fields, which do show a latitudinal gradient [*Maynard et al.*, 1988], then the fluctuation power may indeed also reflect these gradients.

Ionospheric E field generation mechanisms. We f some support for these tentative conclusions in the elec field power spectra published by *Earle and Kelley* [198 They find that during active times, magnetospheric elec field power spectra show no radial dependence, indicat of an unshielded, solar wind source. Yet during very q et time periods, spectra at lower L shells in the magne sphere have greater power, consistent with a low-latitu ionospheric source. Since the ionospheric conductances lowest during solar minimum, stronger electric fields w be produced for a given dynamo current than during so maximum [*Fejer*, 1986], making our time period parti larly sensitive to fluctuating ionospheric currents. Fina they show that power spectra at high-latitude depend gre ly upon the geophysical activity level, whereas low-latitu power spectra appear to be essentially independent of suggesting that the low-latitude power is in fact generated a separate mechanism from the high-latitude fluctuations

Since the frequency range for resonance with the d times is approximately 0.03–3 cycles/hr, we are generally below the MHD resonant frequencies in the magnetosph (the lowest-frequency cavity mode ~5 cycles/h [*Harr et al.*, 1991]). We also are below the frequency of the us instabilities that afflict the equatorial region such as tw