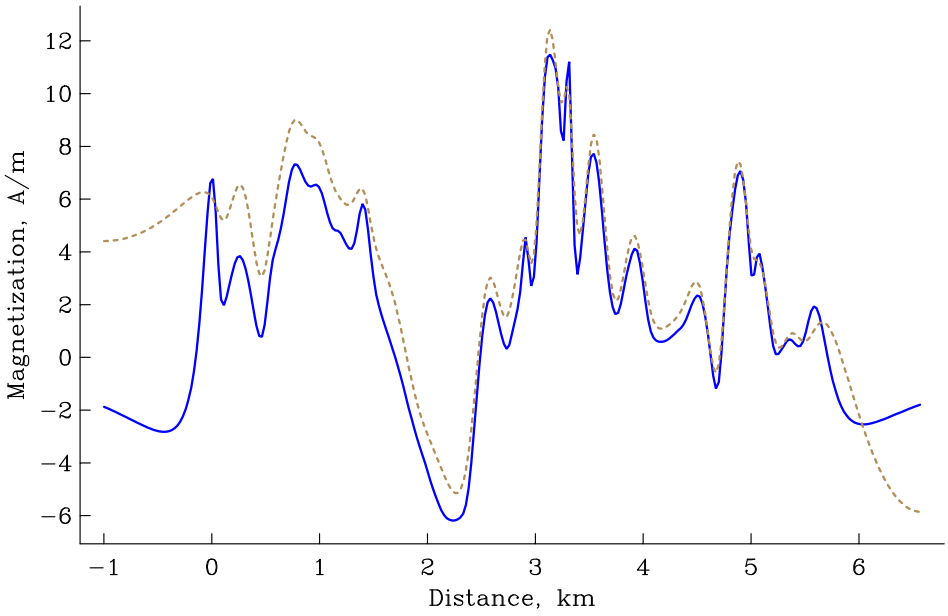

Figure 13.2: Minimum norm and seminorm magnetizations with plausible misfits.

m_0 near 3.2 km has been greatly reduced, but that is hard to see in this graph. We probably can conclude that the crustal magnetization is far from constant along this profile, and that big swings in the original field are not due to effects of topography (changes in range of the magnetometer from the sources), but are a genuine reflection of variable magnetic intensity in the basement. But whether or not reversed magnetization is required has not been established; it certainly looks like it on the present evidence.

A few other loose ends. The data misfit I selected, $T^2 = 99.3$ corresponds to $P = 0.5$ for χ^2_N. The minimum L_2 norm turns out to be $10.970\,\mathrm{A\,m^{½}}$. Suppose now I select a more generous misfit, $P = 0.95$, so that the true misfit will be smaller 95% of the time in hypothetical repeat surveys. Then $T^2 = 124.3$ and the new model has norm $10.923\,\mathrm{A\,m^{½}}$. This very small reduction arises from the very small difference between the two models: $\| m_{0.5} - m_{0.95} \| = 0.14\mathrm{A\,m^{½}}$. Indeed, the models are so similar one cannot distinguish between them on a graph of the normal size! As I mentioned earlier, the precise choice of P or T^2 turns out to have little effect provided it is large enough.

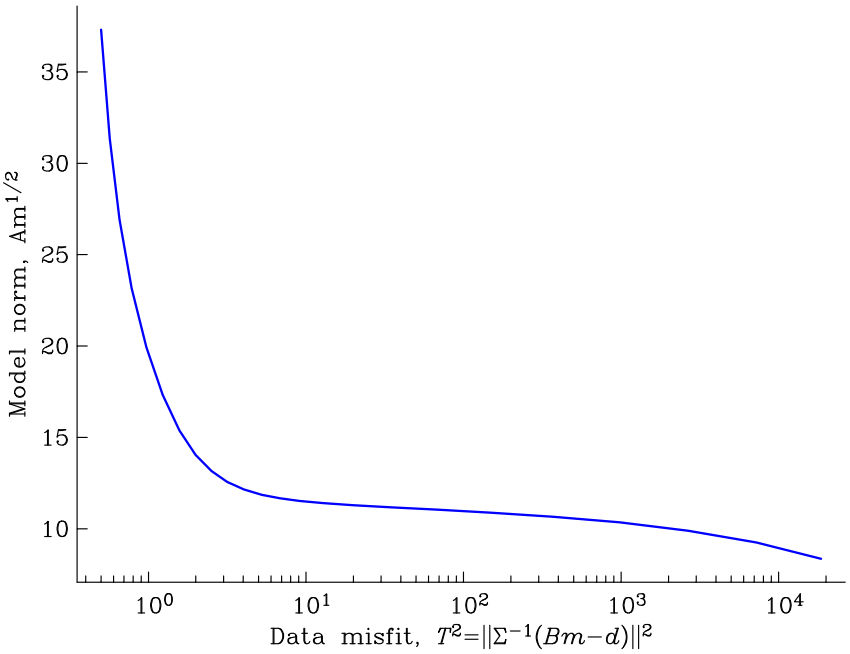

Figure 13.3: The L curve — minimu model norm against data misfit for the marine anomaly system.

This observation leads to the graph of the infamous L curve shown in Figure 13.3. The minimum model norm $\|m\|$, here the L_2 norm, varies with choice of data misfit, T^2 and as we must expect the norm decreases as misfit rises. But there is an enormous plateau in the norm as the misfit varies over a very wide range. Notice that our interest concentrates on the region near $T^2 = 100$. There is a school of thought that asserts the proper choice of misfit is at the "knee" in the L curve, somewhere about $T^2 = 3$. We know from the spectral study thyat is too small, and the solution would be too rough for that misfit.