A method based on the thermal quadrupoles technique for heat transfer is presented for imaging subsurface fluxes at a given depth. A subsurface flux image gives an improved definition of the shape of subsurface flaws that impede the flow of heat in a surface normal direction. A distinct advantage of the technique is that it enables the inversion of thermographic data, without solving the forward heat conduction problem. The method is developed for reduction of thermographic data to the shape of subsurface flaws from flash thermography, however is extendable to other forms of heating. The method is shown to be robust in the presence of uneven heating. The limitations of the technique are explored by application of the method to both simulation and experimental data. Results are presented for both delaminations and flat bottom holes in composite specimens.