7. The following soil temperatures (°C) were measured during the Great Plains Field Program at O'Neil, Nebraska:

		Depth (m)				
Time (h)	Day	0.025	0.05	0.10	0.20	0.40
0435	August 31	25.54	26.00	26.42	26.32	24.50
0635		24.84	25.30	25.84	25.97	24.48
0835		25.77	25.35	25.42	25.56	24.36
1035		29.42	27.36	25.98	25.39	24.34
1235		33.25	30.32	27.62	25.57	24.27
1435		35.25	32.63	29.52	26.11	24.24
1635		34.84	33.20	30.62	26.88	24.26
1835		32.63	32.05	30.62	27.41	24.32
2035		30.07	30.20	29.91	27.68	24.47
2235		28.42	28.74	28.84	27.57	24.64
0035	September 1	27.09	27.50	27.84	27.22	24.73
0235		26.09	26.60	27.06	26.87	24.78
0435		25.30	25.83	26.40	26.53	24.84

(a) Plot on a graph temperature waves as functions of time and depth.
(b) Plot on a graph the vertical soil temperature profiles at 0435, 0835, 1235, 1635, 2035, and 0035 h.
(c) Determine the damping depth and thermal diffusivity of the soil from the observed amplitudes, as well as from the times of temperature maxima (taken from the smoothed temperature waves) as functions of depth.
(d) Estimate the amplitude of the surface temperature wave and the time of maximum surface temperature from extrapolation of the soil temperature data.

8. From the soil temperature data given in the above problem, calculate the ground heat flux at 0435 and 1635 h, using Equation (4.4) with the measured soil heat capacity of $1.33 \times 10^6\ \mathrm{J\ m^{-3}\ K^{-1}}$ and the average value of thermal diffusivity determined in Problem 7(c) above.