Table 1. Soil and site descriptions for control sites at Scott Base, Marble Point and Bull Pass.

	Scott Base	Marble Point	Bull Pass
GPS location	77°50'53.9"S 166°45'40.7"E	77 ° 25' 9.9" S 163 °40'55.1"E	77°31'05.7"S 161°51'57.3"E
Site description	200 m directly up-hill from Scott Base. Slope of 6° to SE, 60 m above s.l.	Marble Point old camp, 60 m east of lake edge. Slope of 3° to E, 60 m above s.l. 30% surface rock cover.	400 m east of Bull pass camp in Wright Valley. Slope of 4° to S, 250 m above s.l. 20% surface rock cover.
***Soil Classification**	Lithic Haplorthel	Glacic Haplorthel	Typic Anhyorthel
Parent lithology and material	Predominantly mafic, scoriaceous basalt dominated till over scoria basalt bedrock.	Predominantly calcareous, marble dominated glacial till with common granite and gneiss.	Predominantly siliceous, silt dominated glacial till over granite bedrock.
Brief Soil Description	Stony, gravelly sands derived mainly from basalt with ice-cemented permafrost below about 30 cm.	2 cm of desert pavement gravels over sandy gravel with > 30 % boulders/stones. Ice-dominated horizon from 87—100+ cm.	2 cm of gravel desert pavement over 1+ m of silt with a few large rocks. Visible salt accumulation on profile face. No ice-cement.

*Soil classifications are those of Soil Survey Staff (1998).

analysing the extracts by capillary gas chromatography with a flame ionisation detector as outlined in EPA Methods 8015.

Climate data collection, and soil moisture retention and hydrophobicity determination

Soil climate stations were established at the three control sites, each in an undisturbed area typical of the surrounding terrain and soils, and in hydrocarbon-contaminated sites at Scott Base and Marble Point. A CR10X-2M data logger is installed at each site with above-ground sensors to record air temperature, relative humidity, solar radiation, and wind speed and direction. Thermistors and Vitel sensors are installed at depths of up to 1.2 m to measure soil moisture and temperature contents. Data are collected at a maximum of 1-hour intervals and downloaded annually.

Soil moisture retention was determined using a Haines apparatus (2.5 and 5 kPa) and pressure plate apparatus (10, 20, 40, 100, 300 and 1500 kPa) following the methods of Klute (1986). Field-moist soil samples, sieved through an 8 mm sieve, were repacked to achieve a bulk density of approximately 1.6 g cm^{-3}. Soil hydrophobicity was determined using the molarity of ethanol droplet method of Carter and Hamilton (1995).

Results and Discussion

Hydrocarbon analysis

Hydrocarbon levels were elevated at all the contaminated sites (Table 2). The concentrations of the hydrocarbons in the contaminated soils sampled vary due to differences in the mixtures of hydrocarbons spilled, the amount and rate at which they were spilled, soil permeability, and the time since spillage. At the contaminated sites, hydrocarbon levels ranged from below detectable limits to 29 100 μg g^{-1} dried soil. These levels were within the ranges reported for contaminated soils from around the H. Arctowski Polish station (Kryszowska 1990), McMurdo Station (Tumeo and Wolk 1994), Palmer Station (Kennicutt *et al.* 1992) and Davis station (Green and Nichols 1995).

Fuel oils spilled on Antarctic soils can move into subsurface soils (Balks *et al.*1998, Gore *et al.* 1999) . Hydrocarbons were detected in subsurface