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EVAPORATION MEMORANDUM NO 42

1956-1975 AVERAGE MONTHLY TOTALS OF POTENTIAL EVAPOTRANSPIRATION

M J PRIOR

The averages presented in this memorandum were formed from individual monthly potential evapotranspiration (PE) totals and they apply to a complete cover of short green vegetation with an albedo of 0.25.

The monthly calculations were done using the following formula, which is, with one amendment, that published by Penman in 1962[1].

$$E = (\Delta H + \gamma Ea)/(\Delta + \gamma)$$

Where Δ is the slope of the saturation vapour pressure curve at the air temperature and γ is the hygrometric constant.

H is given by the equation

$$H = 0.75 Ra (0.18 + 0.55 n/N) - 0.95 \sigma Ta^4 (0.10 + 0.90 n/N) (0.56 - 0.092 \sqrt{ed})$$

where Ra is the amount of short wave radiation reaching the outside of the earth's atmosphere (expressed in millimetres of water evaporated per day), n/N is the ratio of observed hours of sunshine to possible hours, σTa^4 is the theoretical black-body radiation in equivalent millimetres per day at mean air temperature Ta (degrees Kelvin) and ed is the vapour pressure (mm. Hg) at Ta. The coefficient 0.95 is the amendment referred to and is intended to allow for vegetation not radiating as a perfect black-body, following Budyko[2].

Ea is given by the equation

$$Ea = 0.35 (ea - ed) (1 + 0.01 U_2)$$

Where ea is the mean saturation vapour pressure (mm. Hg), ed is the vapour pressure (mm. Hg) and U_2 is the 2 metre windspeed (run of wind in miles day^{-1}).

The meteorological data used in the calculations were mean monthly values of air temperature, vapour pressure, daily sunshine duration and windspeed. For almost all the stations these were obtained from observations made at least 4 times a day. Observations were made only at 09 GMT at Oxford, High Mowthorpe and Altnahinch, but the PE data calculated for these stations appear to be reasonable, so they have been included.

If a station did not have PE data for the whole of the period 1956-1975, a weighting method was used to estimate the 20-year averages. For example, if only N years of data were available at station 'x', a nearby '20-year' station was selected and the N-year averages at this were expressed as percentages of its 20-year averages. Using these percentages, N-year averages at station 'x' were adjusted to give the estimated 20-year averages. In a few cases, 2 nearby '20-year' stations were used and the means of percentages were applied to the N-year averages of station 'x'. In the tables, 'weighted' stations are indicated by an asterisk.

Figure 1 shows the locations of the PE stations. The averages were mapped month by month and these are given in Figures 2 to 13. A map of average annual PE is given in Figure 14.

Acknowledgments

The author is grateful for the assistance of staff at the Meteorological Office, Edinburgh in providing averages for the Scottish stations.

References

1. J Agric Sci, Cambridge, 58, 1962, p 343.

2. The heat balance of the earth's surface, Leningrad, Gidrometeoizdat, 1956.

Meteorological Office (Met O 8c)
Bracknell
Berkshire

November 1977

LP

1956-1975 AVERAGE MONTHLY TOTALS OF POTENTIAL EVAPOTRANSPIRATION IN MILLIMETRES

ENGLAND AND WALES

STATION & GRID REF	J	F	M	A	M	J	J	A	S	O	N	D	YEAR
Aberporth 22/247516	12.6	18.2	38.6	54.8	80.2	90.5	85.1	73.4	51.9	31.6	19.1	11.8	567.8
Abingdon* 41/482990	5.0	13.4	34.8	57.0	85.1	101.9	96.9	80.7	49.2	22.2	6.3	2.6	555.1
Acklington 46/225007	4.9	12.4	30.6	48.7	71.1	83.9	80.7	64.7	39.2	19.1	5.2	3.8	464.3
Binbrook* 53/196958	4.2	12.0	33.0	51.0	79.4	93.0	89.7	75.1	49.8	22.5	6.1	3.1	518.9
Boscombe Down 41/172393	4.1	12.3	32.5	57.0	83.7	98.6	96.6	79.0	49.4	21.5	5.8	2.3	542.8
Brize Norton* 42/289060	4.1	11.9	32.9	54.2	81.7	98.8	93.6	75.3	47.1	21.8	4.9	2.5	528.8
Cardington 52/083464	4.8	12.8	32.9	54.8	81.5	97.2	93.9	78.3	48.8	22.1	6.6	3.3	537.0
Carlisle* 35/384603	4.2	9.4	28.5	48.9	77.7	89.9	80.3	66.0	39.5	18.9	3.9	2.7	469.9
Coltishall* 63/262229	5.6	14.1	35.9	56.5	86.0	96.3	92.0	76.1	51.6	25.4	9.0	4.9	553.4
Cranwell 53/003494	1.4	7.1	26.7	50.9	85.9	101.2	94.4	75.9	45.5	16.7	1.7	1.0	508.4
Dungeness* 61/094169	8.0	17.0	32.3	56.3	84.9	99.6	97.0	85.2	58.4	30.2	10.7	4.4	584.0
Elmdon 42/170835	6.1	12.9	32.8	55.4	84.2	99.8	94.0	76.0	46.7	23.0	7.5	5.2	543.6

*** Averages obtained by a weighting method**

1956-1975 AVERAGE MONTHLY TOTALS OF POTENTIAL EVAPOTRANSPIRATION IN MILLIMETRES

ENGLAND AND WALES

STATION & GRID REF	J	F	M	A	M	J	J	A	S	O	N	D	YEAR
Exeter 20/995937	7.9	16.5	35.3	57.5	80.2	97.6	95.5	76.4	48.0	22.3	9.5	5.5	552.2
Filton 31/598802	7.3	14.2	34.3	56.7	85.5	102.2	99.0	80.7	50.1	24.5	9.3	4.8	568.6
Finningley* 43/658985	5.0	12.3	33.9	55.0	82.7	98.7	91.8	77.5	47.3	21.7	7.2	4.8	537.9
Gatwick* 51/265407	3.7	12.3	31.1	53.4	81.8	97.1	93.3	76.9	46.1	19.6	5.2	2.3	522.8
Gloucester* 32/851177	6.9	13.9	33.8	55.7	84.5	101.1	96.4	78.5	48.3	22.8	8.7	4.1	552.7
Gorleston* 63/534037	7.6	14.5	32.7	52.0	79.2	91.3	90.2	77.3	52.2	25.3	11.6	7.3	541.2
Hartland Point* 21/231277	15.2	18.3	36.7	55.8	79.9	92.0	89.8	77.2	56.8	35.1	22.8	15.0	594.6
Heathrow 51/077768	7.1	15.9	37.8	59.5	92.1	110.2	105.8	87.7	55.0	26.7	9.6	5.0	612.4
High Mowthorpe* 44/888685	4.8	10.9	29.1	55.0	83.8	95.7	86.5	75.7	46.9	22.5	6.1	4.4	521.4
Huddersfield 44/113177	4.6	10.8	28.7	48.7	77.9	92.9	84.7	69.1	41.7	21.1	4.9	2.9	488.0
Hurn 40/116978	6.2	13.9	33.8	59.2	85.7	102.4	101.5	83.0	50.6	23.5	8.0	4.6	572.4
Kew 51/171757	9.6	17.2	38.2	60.1	91.3	107.7	104.1	82.5	51.6	24.9	10.5	6.9	604.6
Kilnsea* 54/417161	13.4	15.6	34.9	49.1	74.9	84.9	85.7	72.0	47.8	23.7	10.1	8.9	521.0

* Averages obtained by a weighting method

1956-1975 AVERAGE MONTHLY TOTALS OF POTENTIAL EVAPOTRANSPIRATION IN MILLIMETRES

ENGLAND AND WALES

STATION & GRID REF	J	F	M	A	M	J	J	A	S	O	N	D	YEAR
Leeming* 44/305890	6.9	12.9	34.0	54.0	81.4	91.8	85.8	73.6	44.6	23.6	8.7	6.6	524.0
Little Rissington 42/209191	3.2	10.9	31.4	52.0	79.7	96.3	92.1	74.8	47.9	21.1	4.9	1.9	516.2
Lyneham 41/012786	4.3	11.8	32.6	54.8	82.4	99.3	96.6	77.4	47.4	21.6	5.4	2.3	535.9
Manby* 53/391869	4.0	11.3	30.6	49.8	77.4	91.1	85.2	73.3	46.2	20.1	5.3	3.4	497.7
Manston* 61/335666	8.1	16.3	35.6	55.7	86.1	100.9	100.9	88.8	57.0	27.5	11.5	6.8	595.2
Marham* 53/739087	2.8	10.8	32.0	55.4	83.0	97.2	91.9	75.9	48.9	23.2	5.5	3.0	529.5
Mildenhall* 52/683778	4.7	12.8	34.1	57.0	88.1	101.7	95.7	81.0	49.8	23.7	4.7	2.2	555.5
Milford Haven* 12/892054	12.9	17.1	37.6	57.3	83.4	96.8	90.6	78.1	54.5	30.8	16.8	12.1	588.0
Mumbles* 21/626871	18.2	21.8	41.0	57.1	90.8	95.8	96.0	83.5	60.4	35.8	22.5	16.6	639.5
Oxford 42/509072	4.5	12.5	32.4	55.1	85.6	102.6	99.6	78.8	48.4	21.8	5.9	2.9	550.1
Pershore* 32/973495	6.0	13.3	34.5	57.2	85.8	104.9	99.1	81.1	50.3	23.1	7.4	4.1	566.8
Plymouth 20/492529	10.5	16.3	35.2	58.0	82.3	96.7	94.1	76.6	52.9	26.9	13.2	8.4	570.2
Rhoose* 31/060676	6.9	13.4	33.5	56.4	80.9	97.0	94.4	80.0	50.0	25.7	9.7	6.1	554.0

*** Averages obtained by a weighting method**

1956-1975 AVERAGE MONTHLY TOTALS OF POTENTIAL EVAPOTRANSPIRATION IN MILLIMETRES

ENGLAND AND WALES

STATION & GRID REF	J	F	M	A	M	J	J	A	S	O	N	D	YEAR
Ringway 33/818850	9.0	15.8	37.6	57.9	88.7	100.5	91.3	77.9	50.1	26.1	10.3	6.6	571.8
Ronaldsway 24/279688	15.5	20.0	33.8	57.3	81.8	94.9	92.7	73.2	49.5	31.4	19.6	17.1	586.8
St Mawgan 10/871642	10.3	15.1	33.6	57.6	81.2	94.3	91.7	75.9	52.9	27.6	14.6	8.5	563.3
Shawbury 33/553220	5.8	12.6	31.9	53.0	79.9	95.3	89.6	72.9	44.6	21.1	6.2	4.8	517.7
Shoeburyness 51/948857	7.1	14.1	30.7	51.9	81.9	99.2	99.2	82.5	51.0	24.0	9.0	5.8	556.4
Speke 33/415839	9.1	15.7	37.0	56.9	85.1	101.1	88.2	78.0	49.5	27.3	12.1	7.1	567.1
Squires Gate 34/316317	5.4	11.3	32.1	53.7	83.3	99.4	91.7	77.4	48.8	25.7	9.7	3.8	542.3
Stansted 52/551226	3.3	10.6	31.5	54.1	83.1	97.6	94.5	79.4	49.4	21.9	5.1	2.0	532.5
Sth Farnborough* 41/867544	5.1	12.5	32.7	54.8	85.2	99.3	97.9	78.1	47.6	21.8	6.9	3.3	545.2
Tynemouth 45/374694	12.2	18.2	34.9	49.8	71.5	85.6	83.2	68.4	46.3	25.4	11.4	10.7	517.6
Upavon* 41/164547	1.8	7.3	24.6	47.1	76.5	92.9	89.0	71.2	41.6	15.4	3.2	0.8	471.4
Valley 23/310758	13.5	17.5	36.2	57.0	82.7	97.3	89.6	75.9	53.1	32.6	18.7	14.1	588.2
Waddington 43/984650	3.0	10.7	30.9	51.8	82.3	95.2	88.9	74.8	47.5	20.8	4.8	2.0	512.7

*** Averages obtained by a weighting method**

1956-1975 AVERAGE MONTHLY TOTALS OF POTENTIAL EVAPOTRANSPIRATION IN MILLIMETRES

ENGLAND AND WALES

STATION & GRID REF	J	F	M	A	M	J	J	A	S	O	N	D	YEAR
Watnall 43/503456	3.7	11.0	29.8	49.0	75.6	90.8	83.9	70.5	41.7	18.9	4.8	2.4	482.1
Wattisham* 62/026514	2.7	10.2	31.2	52.7	84.0	101.1	94.0	79.3	49.9	22.9	4.1	2.0	533.9
Wittering 53/048032	3.9	12.3	33.7	55.2	85.5	99.2	96.3	78.6	50.2	23.5	6.3	3.6	548.3
Wyton* 52/284745	5.3	12.7	33.5	57.7	88.4	101.5	98.6	79.6	53.2	25.1	6.2	3.9	565.6
Yeovilton* 31/551237	8.2	15.7	36.3	61.4	86.9	100.6	99.2	79.7	50.3	25.2	11.1	5.1	579.7

SCOTLAND

STATION & GRID REF	J	F	M	A	M	J	J	A	S	O	N	D	YEAR
Benbecula 08/784556	9.9	13.7	31.0	50.1	75.2	86.3	76.4	62.6	41.2	23.7	12.7	11.0	493.8
Cape Wrath 29/259747	12.0	13.3	27.3	41.0	59.7	70.1	62.0	52.4	34.8	22.5	12.7	11.9	419.7
Dyce 38/873125	4.9	9.9	29.5	49.5	70.0	83.5	78.1	62.3	38.2	18.5	6.2	4.6	455.2
Eskdalemuir 36/235026	1.7	5.8	21.6	40.7	64.5	78.9	70.0	55.2	31.3	13.3	1.8	2.2	387.0
Glasgow 26/480667	5.3	10.5	31.3	53.4	78.7	93.5	84.5	67.0	39.4	19.7	5.6	4.7	493.6
Kinloss 38/069625	9.5	12.9	34.8	54.1	77.5	90.0	86.2	67.8	45.0	26.6	10.1	9.4	523.9
Kirkwall 310/483076	8.2	11.4	30.1	45.2	63.7	75.4	70.4	55.0	36.0	19.0	10.9	10.2	435.5

* Averages obtained by weighting method

1956-1975 AVERAGE MONTHLY TOTALS OF POTENTIAL EVAPOTRANSPIRATION IN MILLIMETRES

SCOTLAND

STATION & GRID REF	J	F	M	A	M	J	J	A	S	O	N	D	YEAR
Lerwick 411/453397	10.6	10.5	26.5	40.7	57.3	68.9	62.5	49.4	30.9	17.0	10.2	12.2	396.7
Leuchars 37/468208	4.4	11.3	31.4	52.3	74.5	89.0	87.9	67.0	42.0	20.6	5.6	4.3	490.3
Macrihanish* 16/663226	13.0	20.1	40.9	56.4	83.1	89.8	79.3	68.7	47.8	33.4	19.2	16.3	568.0
Prestwick 26/358269	5.9	10.7	32.8	53.5	80.0	90.2	83.7	68.3	42.1	22.9	8.0	6.2	504.3
Sloy* 27/324099	4.1	8.8	28.4	47.9	69.1	82.8	75.3	59.4	35.2	18.0	5.7	5.4	440.1
Stornoway 19/465332	6.9	10.8	27.3	45.5	68.0	78.3	70.1	56.7	35.9	18.3	6.9	7.1	431.8
Tiree 07/999446	16.2	19.9	36.6	51.9	75.2	83.0	75.4	63.1	43.3	28.5	19.7	17.3	530.1
Turnhouse 36/159739	6.4	11.8	32.1	51.9	74.7	88.7	82.7	66.5	41.0	21.5	6.3	5.3	488.9
Wick 39/366523	8.3	11.4	29.5	45.9	63.7	73.9	68.6	55.3	36.0	21.0	9.7	8.5	431.8

NORTHERN IRELAND

STATION & GRID REF	J	F	M	A	M	J	J	A	S	O	N	D	YEAR
Aldergrove 33/147798	4.4	11.2	29.2	50.1	75.5	87.3	77.3	63.5	40.2	20.7	5.0	2.9	467.7
Altnahinch* 34/117236	3.1	7.4	24.6	40.9	65.1	73.0	62.9	53.1	31.7	15.6	3.4	2.9	385.9
Ballykelly* 24/624238	6.7	13.0	33.5	52.5	74.3	84.3	75.6	64.7	39.3	25.1	7.8	6.6	483.4
Kilkeel* 33/315140	3.2	9.6	31.3	47.1	67.0	80.2	78.1	62.9	38.7	20.0	6.2	3.1	447.4

*Averages obtained by a weighting method

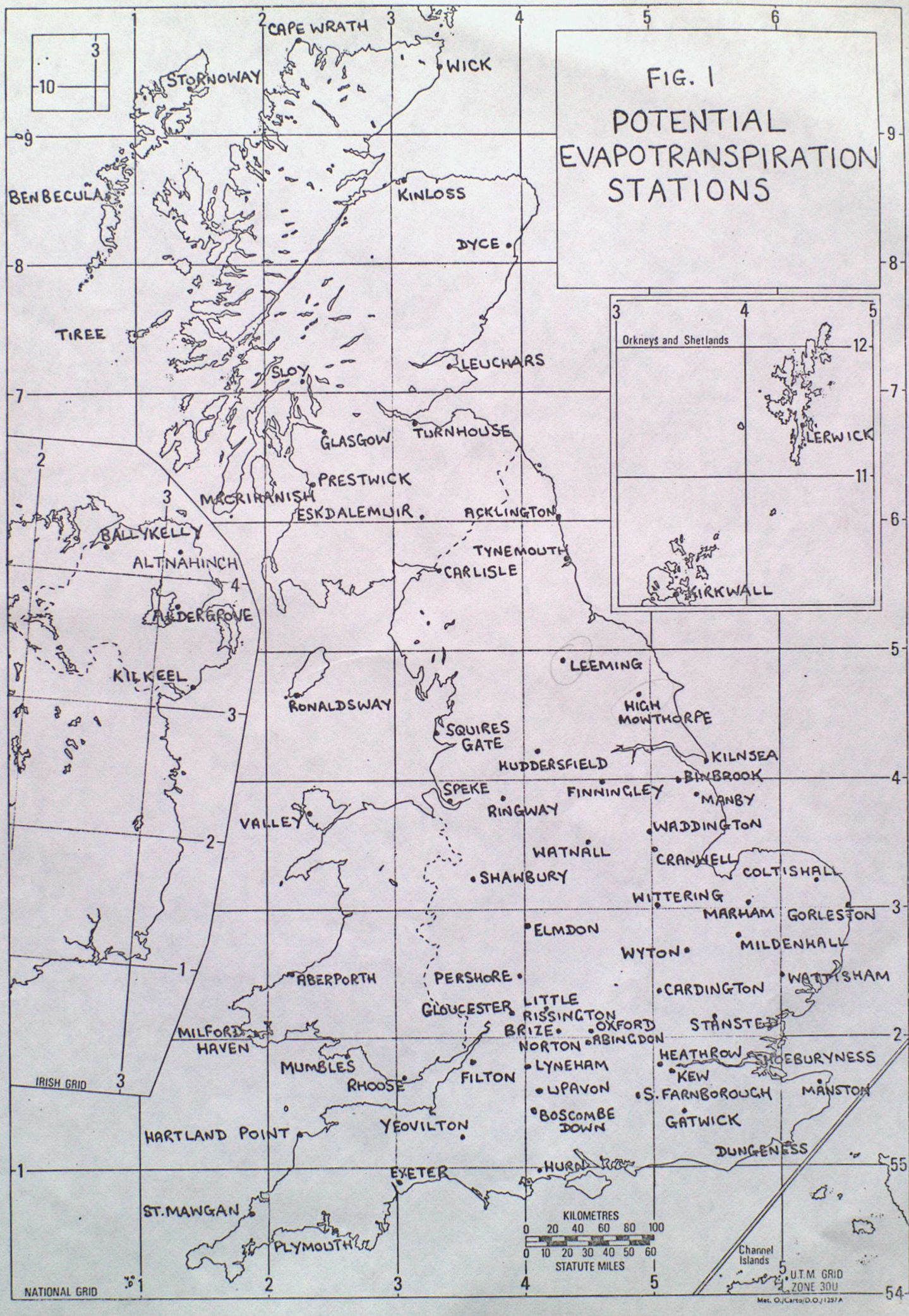
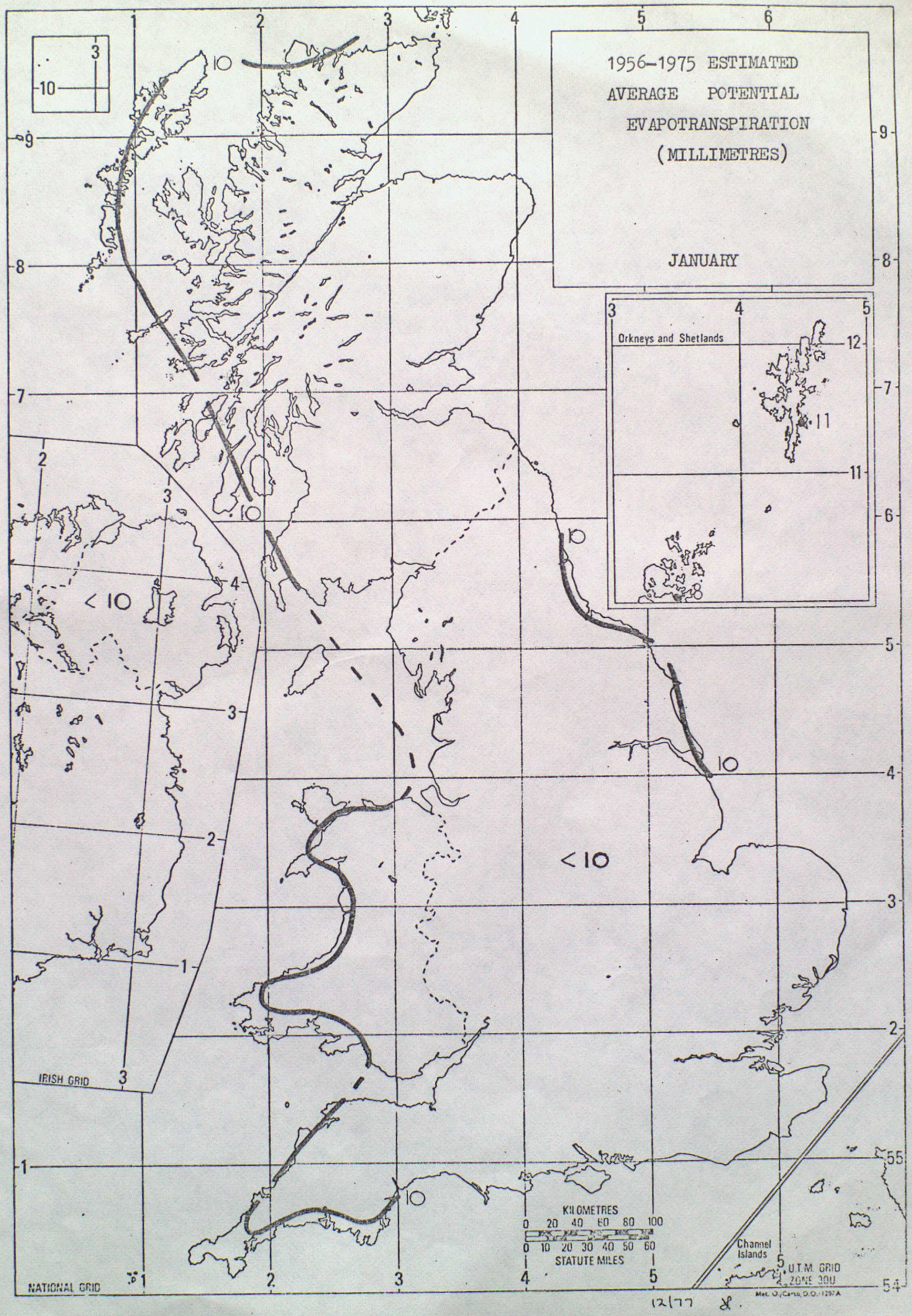


FIG. 1
POTENTIAL EVAPOTRANSPIRATION STATIONS
CAPE WRATH
WICK
STORNOWAY
BENBECULA
KINLOSS
DYCE
TIREE
SLOY
LEUCHARS
GLASGOW
TURNHOUSE
PRESTWICK
MACRIHANISH
ESKDALEMUIR
ACKLINGTON
TYNEMOUTH
CARLISLE
BALLYKELLY
ALTNAHINCH
ALDERGROVE
KILKEEL
RONALDSWAY
LEEMING
HIGH MOWTHORPE
SQUIRES GATE
HUDDERSFIELD
KILNSEA
BINBROOK
SPEKE
FINNINGLEY
MANBY
RINGWAY
VALLEY
WADDINGTON
WATNALL
CRANWELL
COLTISHALL
SHAWBURY
WITTERING
MARHAM
GORLESTON
ELMDON
MILDENHALL
WYTON
ABERPORTH
PERSHORE
WATTISHAM
CARDINGTON
GLOUCESTER
LITTLE RISSINGTON
BRIZE NORTON
OXFORD
ABINGDON
STANSTED
MILFORD HAVEN
HEATHROW
LYNEHAM
KEW
MUMBLES
RHOOSE
FILTON
UPAVON
S. FARNBOROUGH
MANSTON
BOSCOMBE DOWN
GATWICK
HARTLAND POINT
YEOVILTON
DUNGENESS
EXETER
HURN
ST. MAWGAN
PLYMOUTH
Orkneys and Shetlands
LERWICK
KIRKWALL
IRISH GRID
NATIONAL GRID
KILOMETRES
0 20 40 60 80 100
0 10 20 30 40 50 60
STATUTE MILES
Channel Islands
U.T.M. GRID ZONE 30U
Met. O./Carto/D.O./1297A

FIG. 2


1956–1975 ESTIMATED
AVERAGE POTENTIAL
EVAPOTRANSPIRATION
(MILLIMETRES)
JANUARY
Orkneys and Shetlands
< 10
< 10
10
10
10
10
11
12
IRISH GRID
NATIONAL GRID
KILOMETRES
0 20 40 60 80 100
0 10 20 30 40 50 60
STATUTE MILES
Channel Islands
U.T.M. GRID
ZONE 30U

12/77

FIG. 3

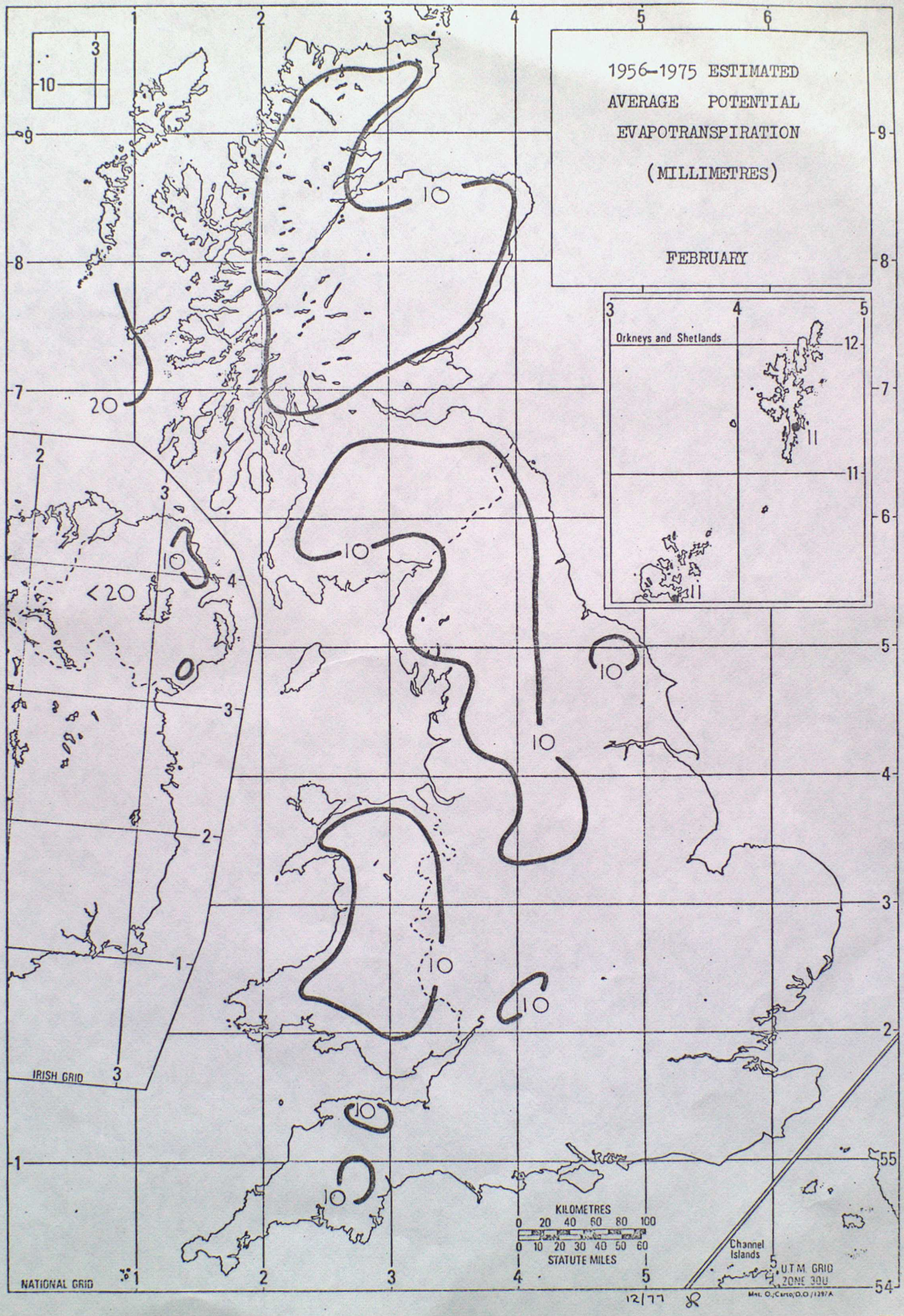
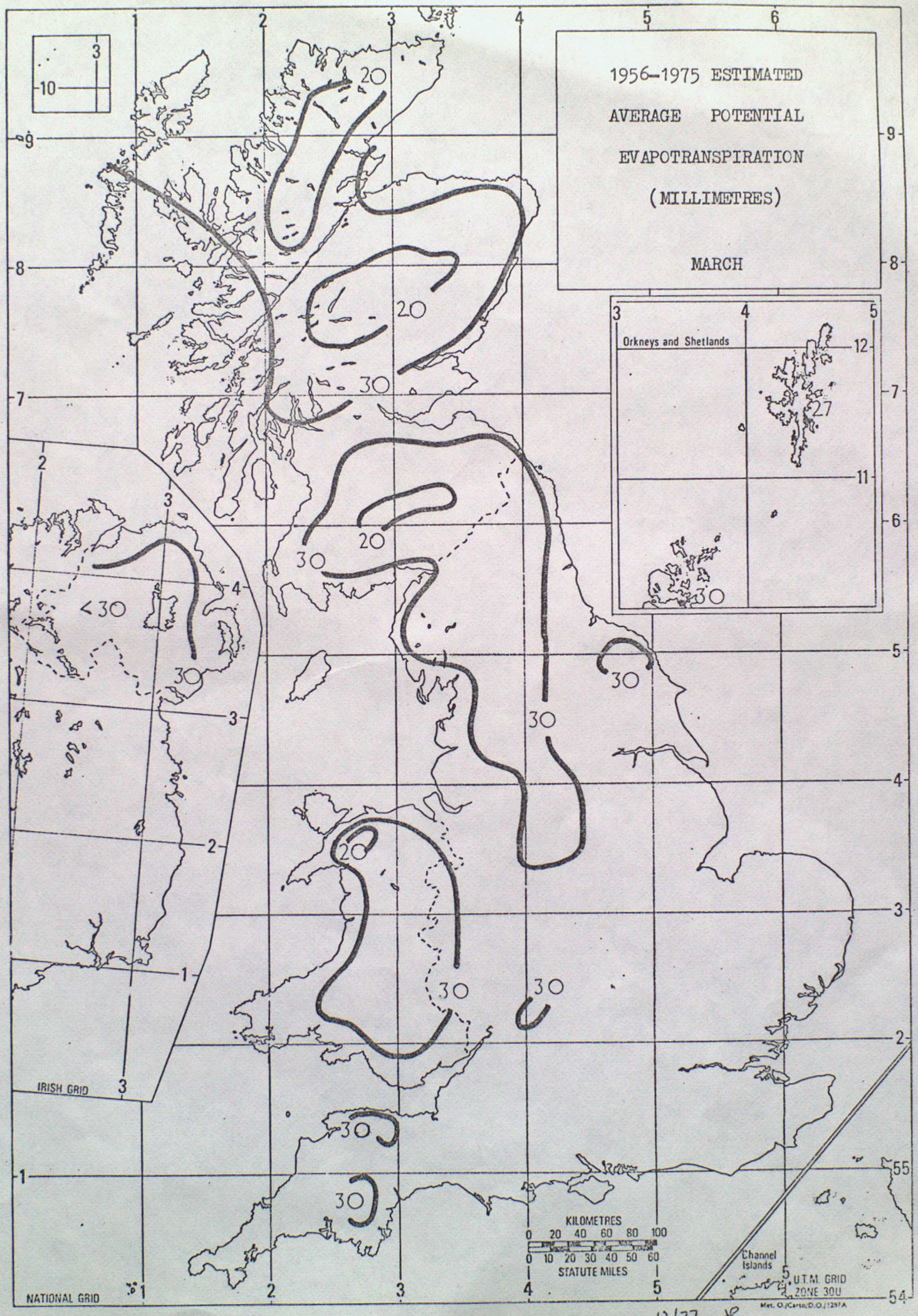

1956–1975 ESTIMATED AVERAGE POTENTIAL EVAPOTRANSPIRATION (MILLIMETRES)
FEBRUARY
Orkneys and Shetlands
10
20
<20
11
IRISH GRID
NATIONAL GRID
KILOMETRES
0 20 40 60 80 100
0 10 20 30 40 50 60
STATUTE MILES
Channel Islands
UTM GRID ZONE 30U
Met. O.(Carto)D.O./1297A
12/77

FIG. 4


1956–1975 ESTIMATED
AVERAGE POTENTIAL
EVAPOTRANSPIRATION
(MILLIMETRES)
MARCH
Orkneys and Shetlands
20
30
<30
27
IRISH GRID
NATIONAL GRID
KILOMETRES
0 20 40 60 80 100
0 10 20 30 40 50 60
STATUTE MILES
Channel Islands
U.T.M. GRID ZONE 30U
Met. O./Carto/D.O./1297A

12/77

FIG. 5

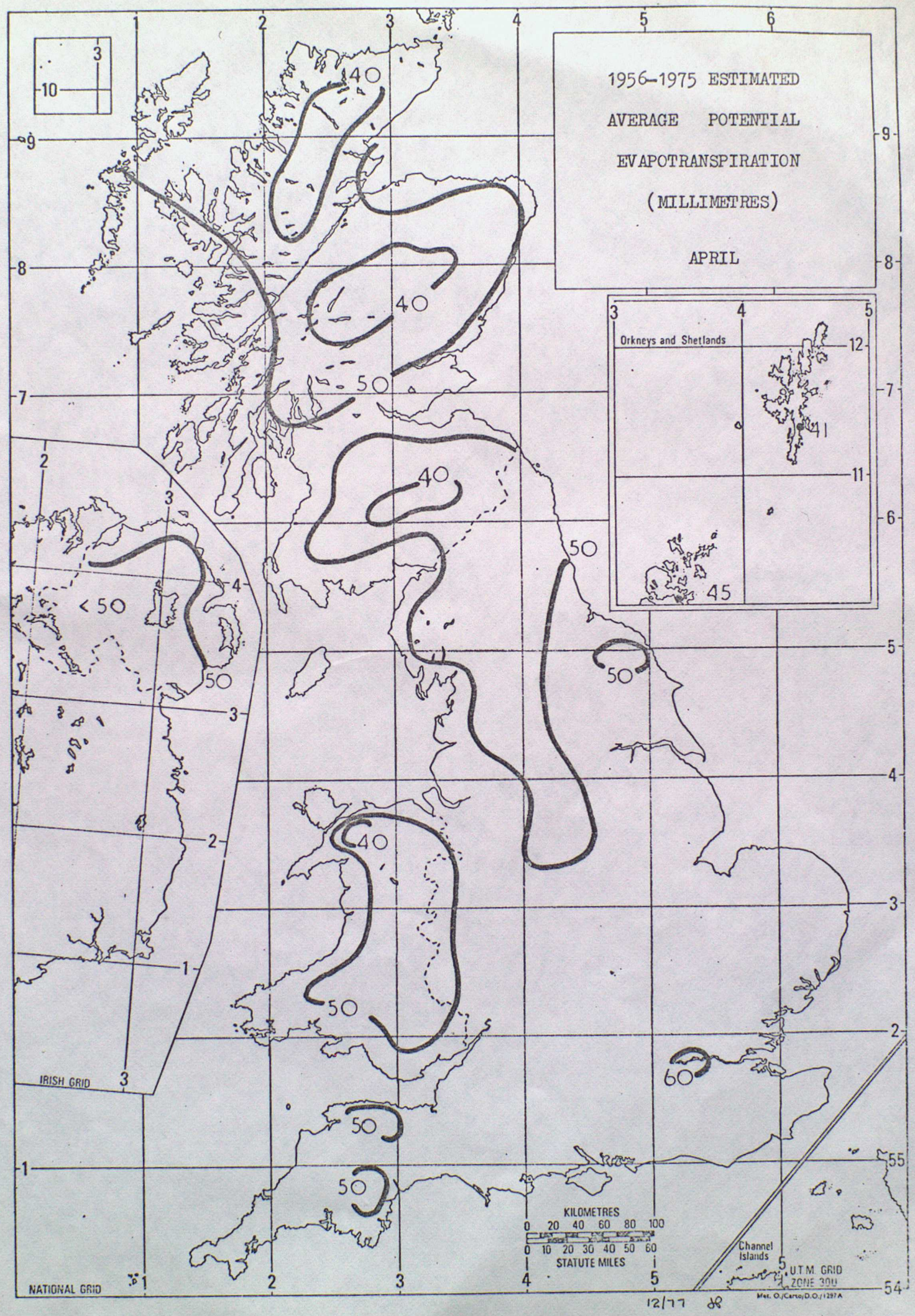

1956–1975 ESTIMATED
AVERAGE POTENTIAL
EVAPOTRANSPIRATION
(MILLIMETRES)
APRIL
Orkneys and Shetlands
40
50
< 50
60
41
45
IRISH GRID
NATIONAL GRID
KILOMETRES
0 20 40 60 80 100
0 10 20 30 40 50 60
STATUTE MILES
Channel Islands
U.T.M. GRID
ZONE 30U
Met. O./Cartog/D.O./1297A
12/77

FIG. 6

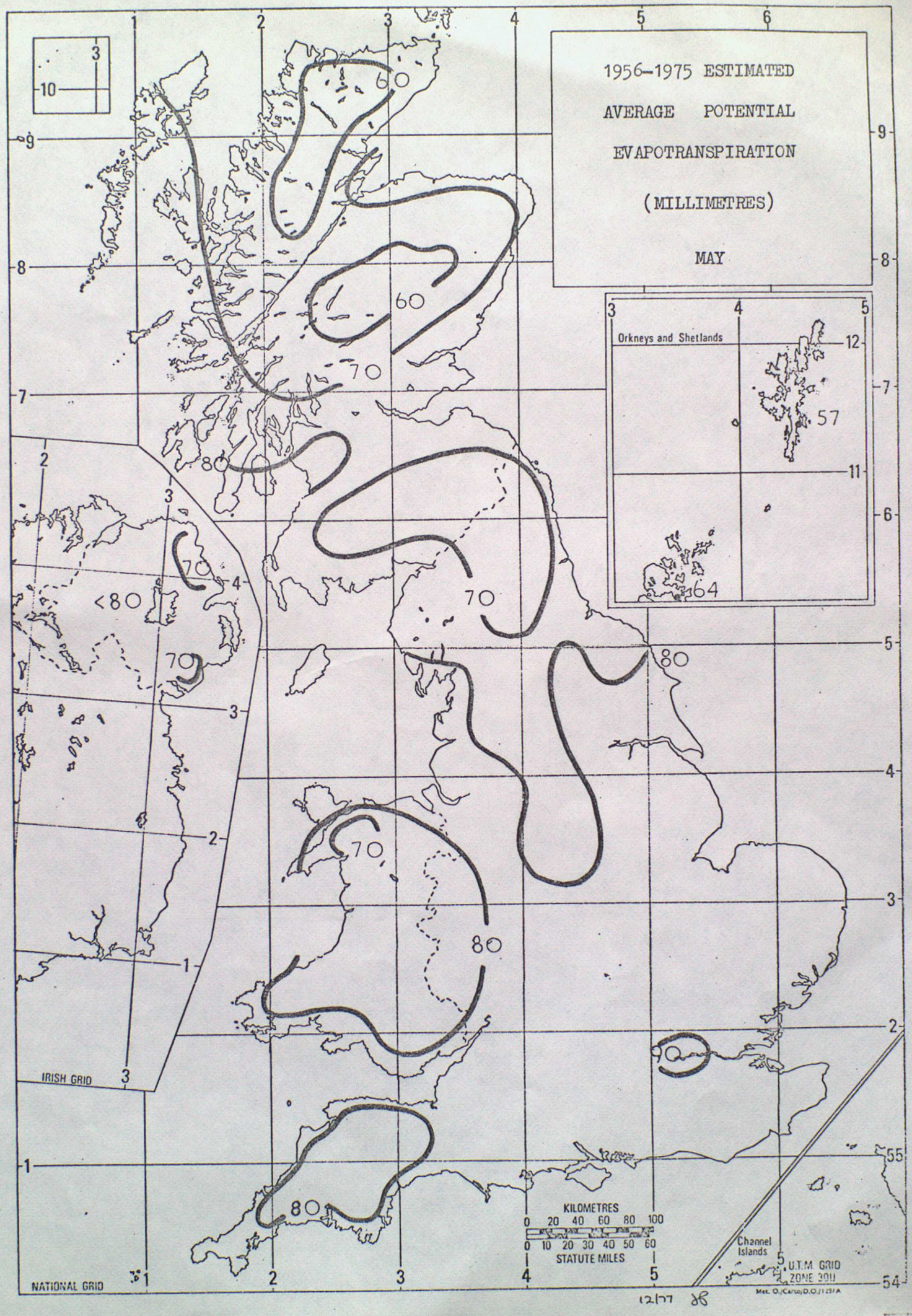

1956–1975 ESTIMATED
AVERAGE POTENTIAL
EVAPOTRANSPIRATION
(MILLIMETRES)
MAY
Orkneys and Shetlands
57
64
60
60
70
80
70
<80
70
70
80
70
80
80
IRISH GRID
NATIONAL GRID
KILOMETRES
0 20 40 60 80 100
0 10 20 30 40 50 60
STATUTE MILES
Channel Islands
U.T.M. GRID ZONE 30U
12/77

FIG. 7

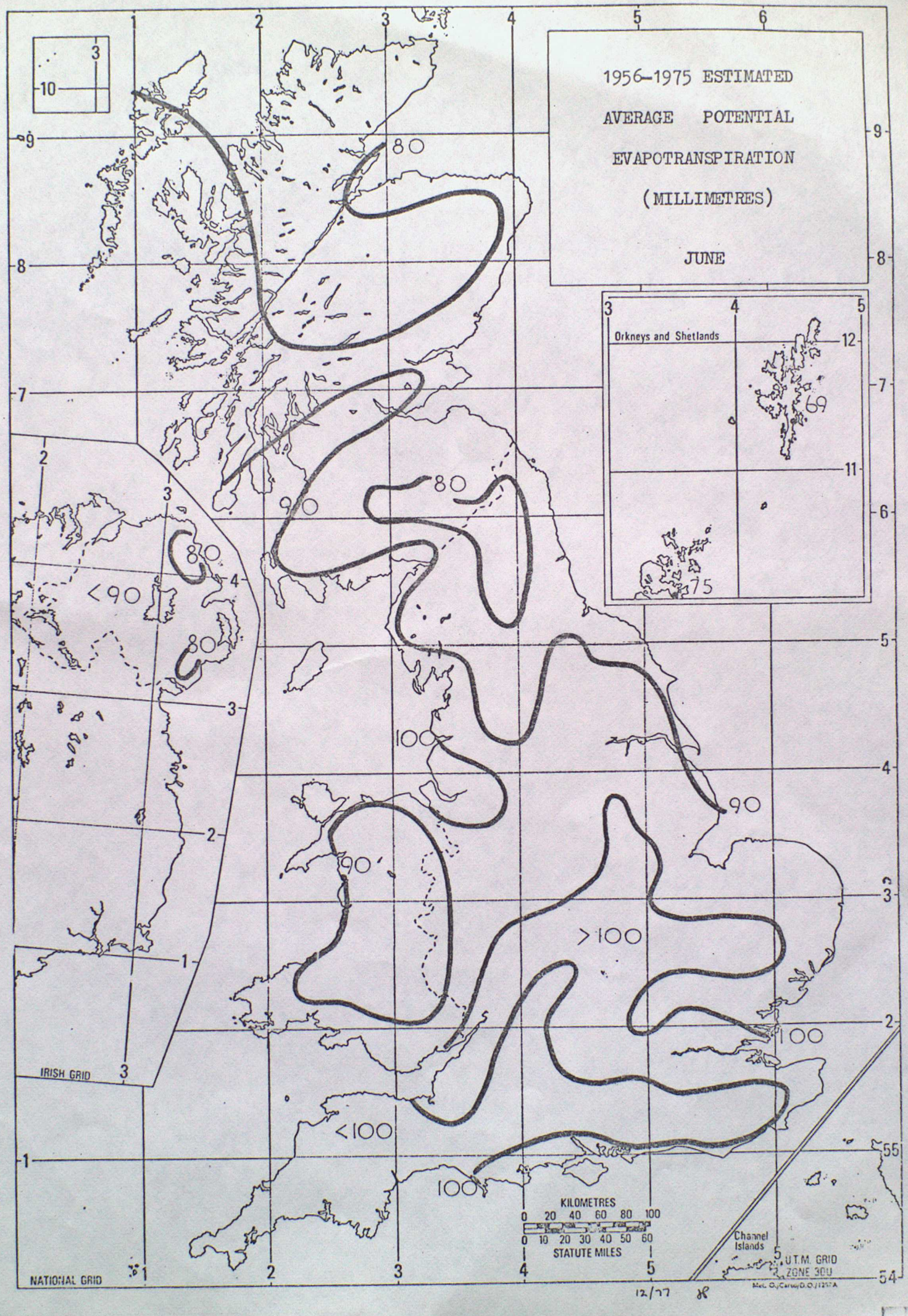
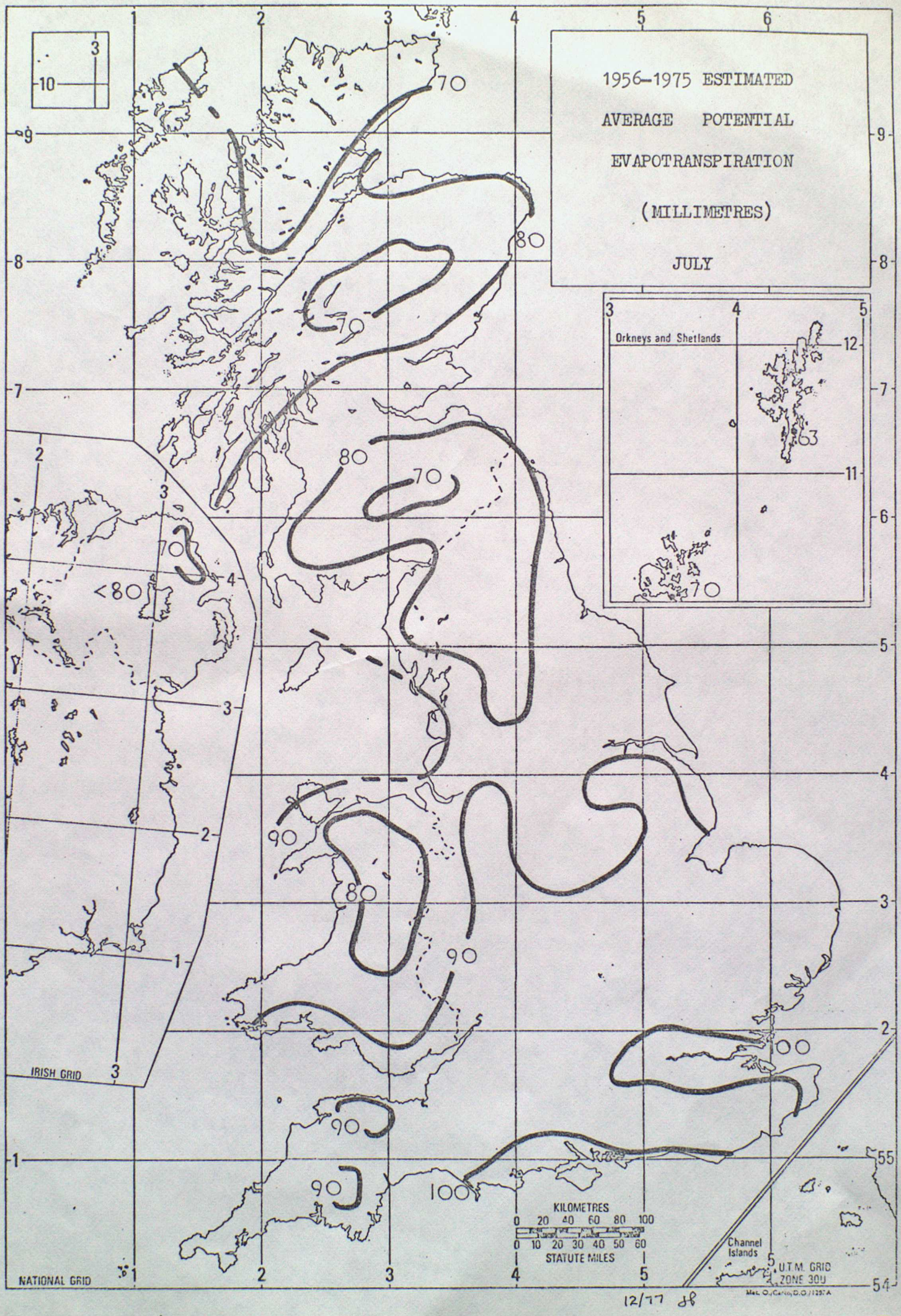
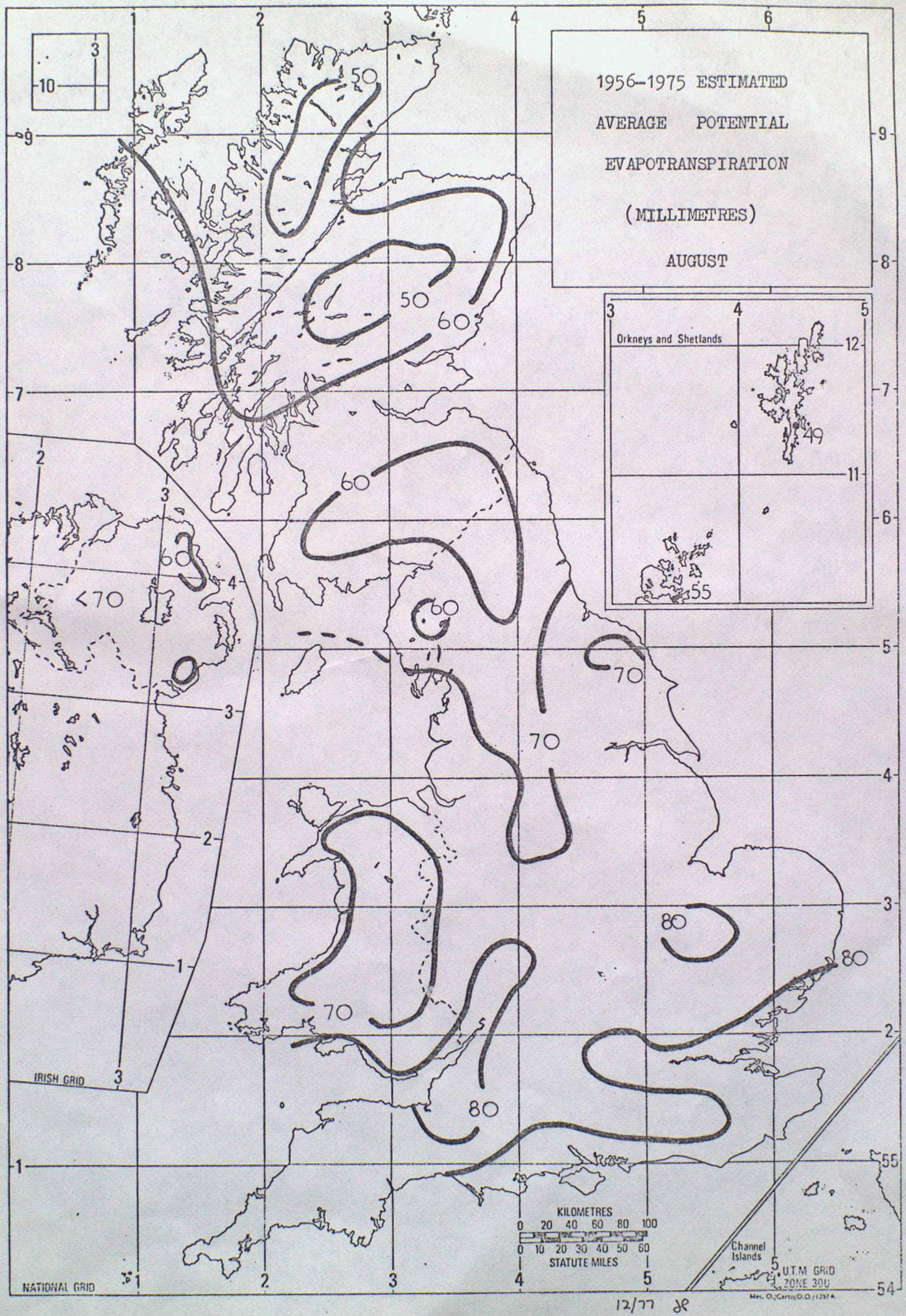

1956–1975 ESTIMATED
AVERAGE POTENTIAL
EVAPOTRANSPIRATION
(MILLIMETRES)
JUNE
Orkneys and Shetlands
69
75
80
90
100
<90
<100
>100
IRISH GRID
NATIONAL GRID
KILOMETRES
0 20 40 60 80 100
0 10 20 30 40 50 60
STATUTE MILES
Channel Islands
U.T.M. GRID
ZONE 30U
12/77

FIG. 8


1956–1975 ESTIMATED
AVERAGE POTENTIAL
EVAPOTRANSPIRATION
(MILLIMETRES)
JULY
Orkneys and Shetlands
70
80
90
100
<80
63
IRISH GRID
NATIONAL GRID
KILOMETRES
0 20 40 60 80 100
0 10 20 30 40 50 60
STATUTE MILES
Channel Islands
U.T.M. GRID
ZONE 30U

12/77 dp

FIG. 9


1956–1975 ESTIMATED
AVERAGE POTENTIAL
EVAPOTRANSPIRATION
(MILLIMETRES)
AUGUST
Orkneys and Shetlands
50
60
70
80
<70
49
55
IRISH GRID
NATIONAL GRID
KILOMETRES
0 20 40 60 80 100
0 10 20 30 40 50 60
STATUTE MILES
Channel Islands
U.T.M GRID
ZONE 30U

12/77 JE

FIG. 10

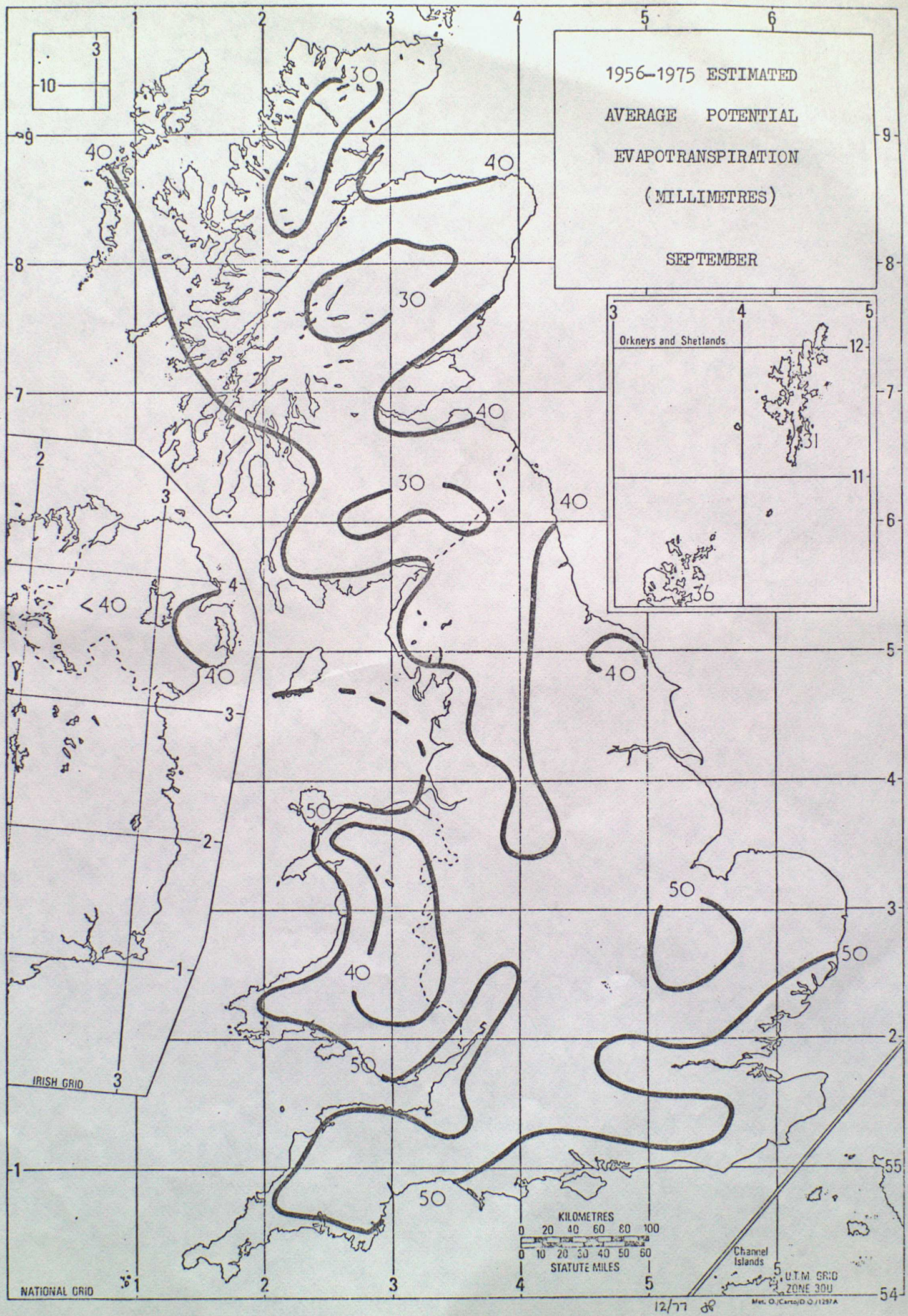
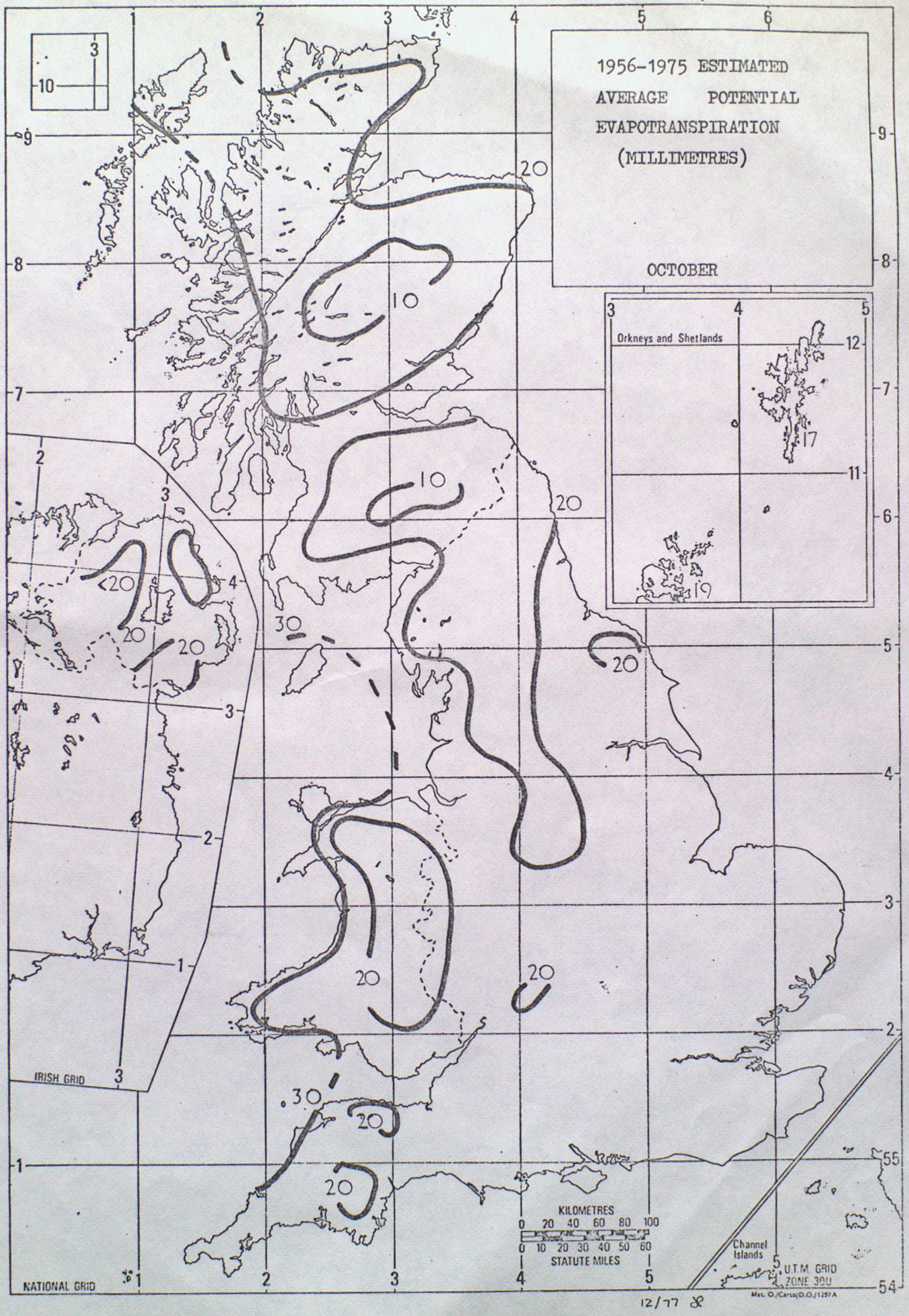

1956–1975 ESTIMATED
AVERAGE POTENTIAL
EVAPOTRANSPIRATION
(MILLIMETRES)
SEPTEMBER
Orkneys and Shetlands
31
36
30
40
50
<40
IRISH GRID
NATIONAL GRID
KILOMETRES
0 20 40 60 80 100
0 10 20 30 40 50 60
STATUTE MILES
Channel Islands
U.T.M. GRID ZONE 30U
Met. O./Carto/D.O./1297A
12/77

FIG. 11


1956-1975 ESTIMATED
AVERAGE POTENTIAL
EVAPOTRANSPIRATION
(MILLIMETRES)
OCTOBER
Orkneys and Shetlands
17
19
10
20
30
IRISH GRID
NATIONAL GRID
KILOMETRES
0 20 40 60 80 100
0 10 20 30 40 50 60
STATUTE MILES
Channel Islands
U.T.M. GRID
ZONE 30U
Met. O./Carto/D.O./1297A

12/77

FIG. 12

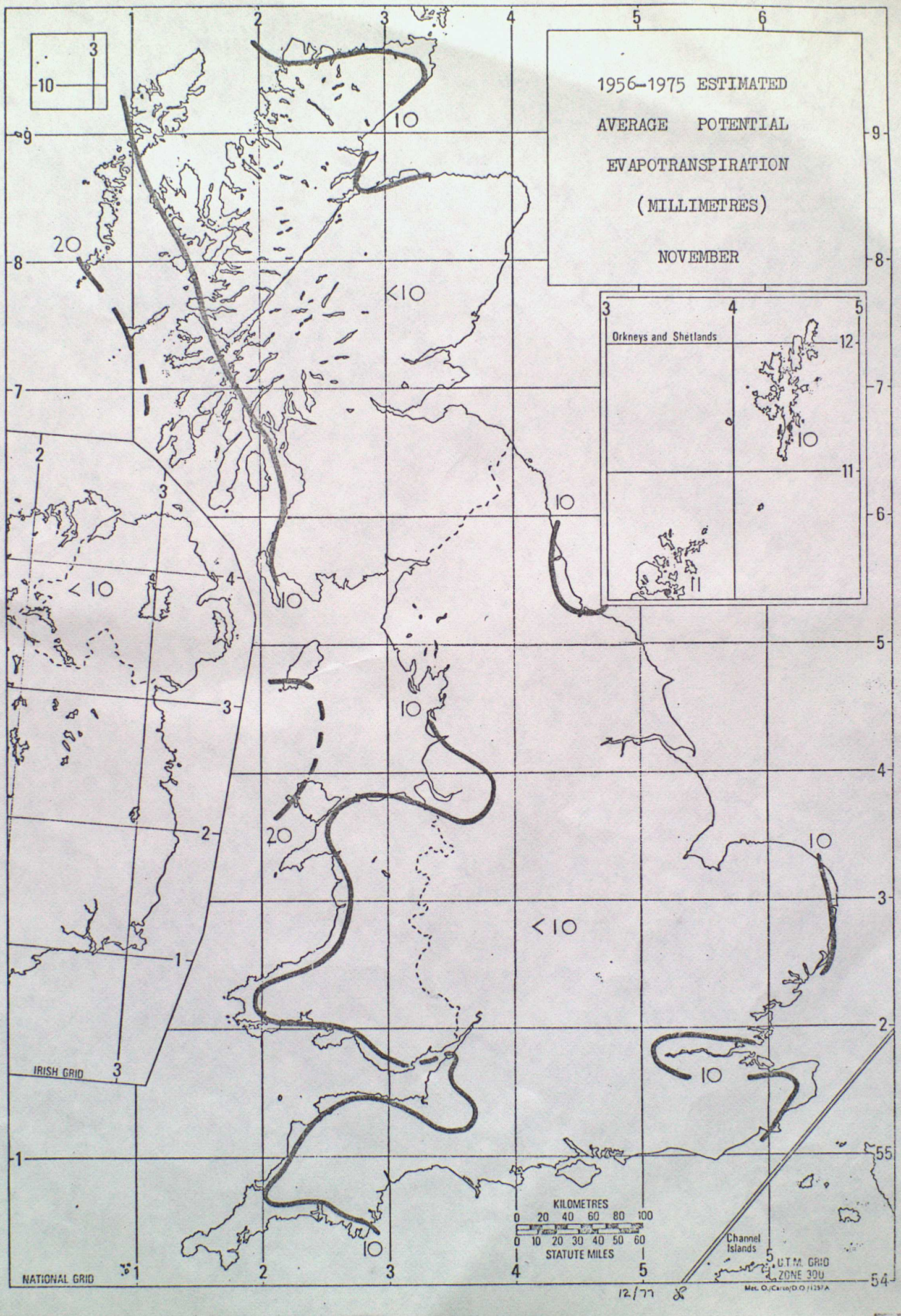

1956–1975 ESTIMATED
AVERAGE POTENTIAL
EVAPOTRANSPIRATION
(MILLIMETRES)
NOVEMBER
Orkneys and Shetlands
IRISH GRID
NATIONAL GRID
KILOMETRES
0 20 40 60 80 100
0 10 20 30 40 50 60
STATUTE MILES
Channel Islands
U.T.M. GRID ZONE 30U
Met. O./Carto/D.O./4257/A
12/77

FIG. 13

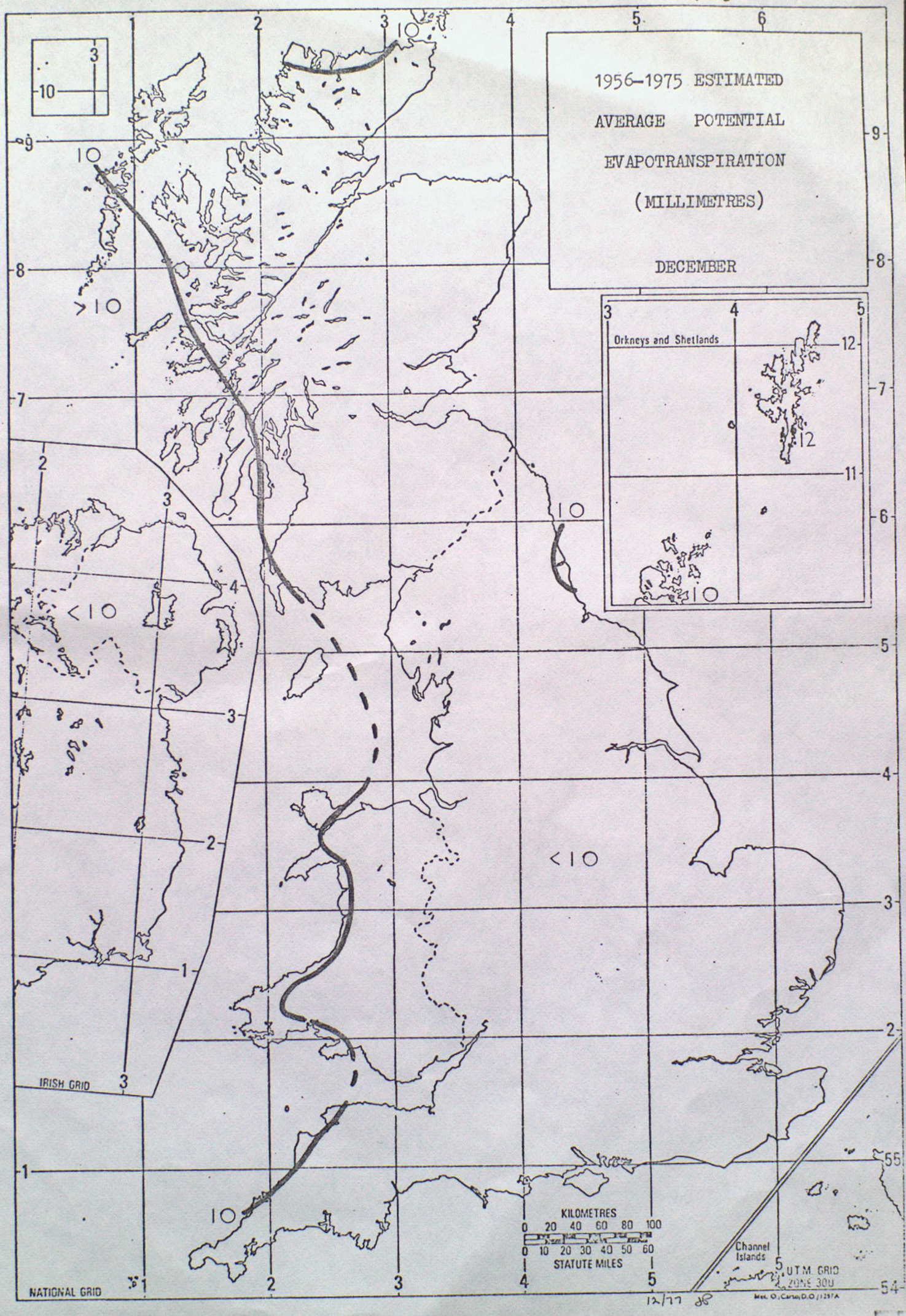
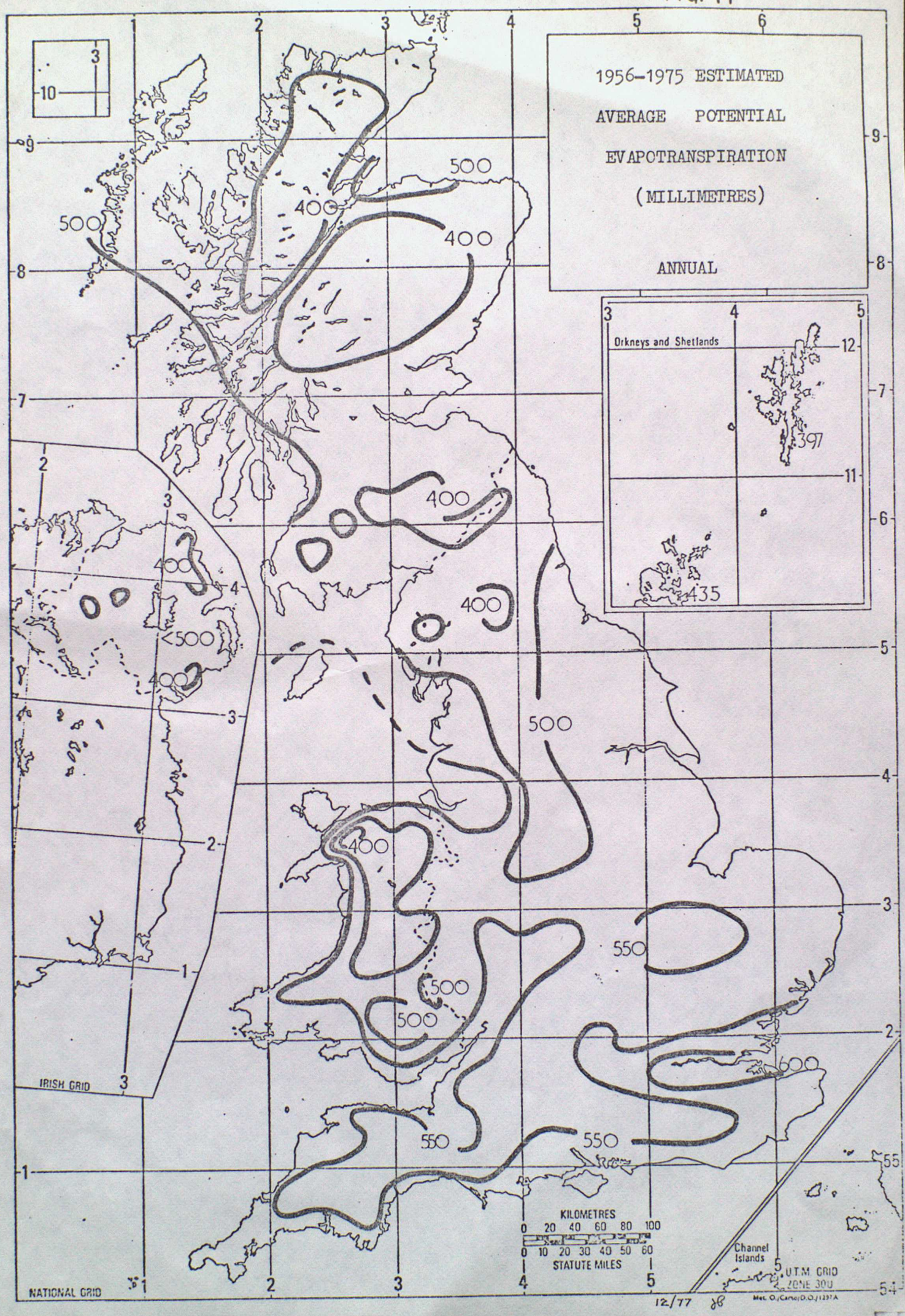

1956–1975 ESTIMATED
AVERAGE POTENTIAL
EVAPOTRANSPIRATION
(MILLIMETRES)
DECEMBER
Orkneys and Shetlands
>10
<10
10
IRISH GRID
NATIONAL GRID
KILOMETRES
0 20 40 60 80 100
0 10 20 30 40 50 60
STATUTE MILES
Channel Islands
U.T.M. GRID
ZONE 30U
12/77

FIG. 14


1956–1975 ESTIMATED
AVERAGE POTENTIAL
EVAPOTRANSPIRATION
(MILLIMETRES)
ANNUAL
Orkneys and Shetlands
397
435
500
400
400
400
400
500
500
400
500
500
550
600
550
550
IRISH GRID
NATIONAL GRID
KILOMETRES
0 20 40 60 80 100
0 10 20 30 40 50 60
STATUTE MILES
Channel Islands
U.T.M. GRID
ZONE 30U
12/77 JB
Met O./Cartog/D.O./1237A