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Analysis of temperature at the Diamond Stations A, C, D and H (Internationale Overflow-Programme)

By W.Krauß, Kiel University

Diamond stations A ("Perseus II"), C ("Maria Julia") and D ("Johan Hjort") form a triangle at the north-eastern slope of the Faroer-Island-Ridge (fig.1). The mean temperature distribution of the 3 positionsis shown in fig.2. Figs. 3-5 give the actual temperature fluctuations during the period 9.6. - 11.6.1960; semidiurnal tidal waves predominate obviously in most of the records. Figs. 6-8 show the power spectra of the records. Application of filter techniques has not been possible.

In the upper and mean layers at the positions C and D semidiurnal tidal waves are well pronounced. This is especially true in mean depths where we find nearly a spectral line. In addition thereto, much power is involved in the long periodic range, indicating a long periodic or non-periodic trend.

Contrary to the results of positions C and D, semidiurnal waves are not found at all at position A, 10 miles away. This indicates that the semidiurnal temperature fluctuations are of an internal type (standing internal waves). Station A seems to be situated at a nodal line (or point). If the semidiurnal temperature fluctuations would be due to the surface tides they would not show such a sudden variation on a distance of only 10 miles.

Diamond station H ("Anton Dohrn") gives a rather complex pattern which could be expected as horizontal movements are superposed on the vertical ones at the western slope of the ridge. The results are not shown here.

Fig.1: Positions of A, C and D
Fig.2: Mean temperature distribution of A,C and D
Fig.3-5: Actual temperature fluctuations at A,C and D
Fig.6-8: Power spectra of fig. 3-5

(All figures are generalised in this paper).

Fig. 1

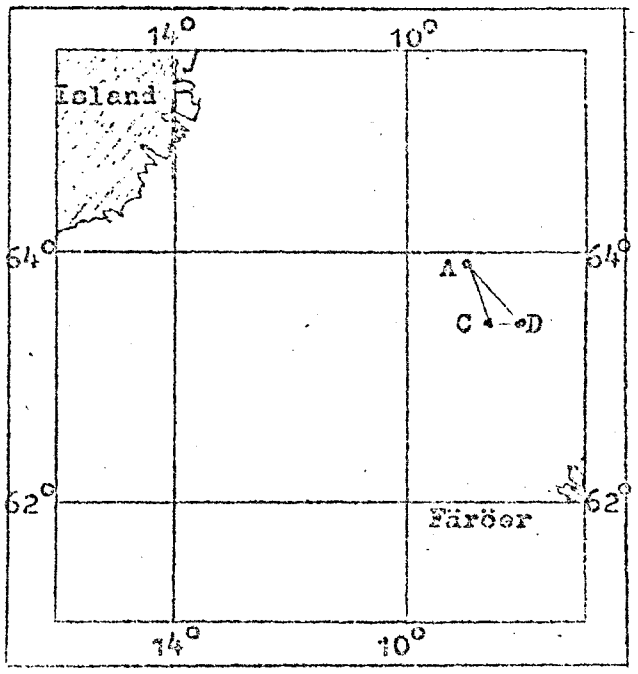

14°
10°
Iceland
64°
A
C
D
62°
Färöer

Fig. 2

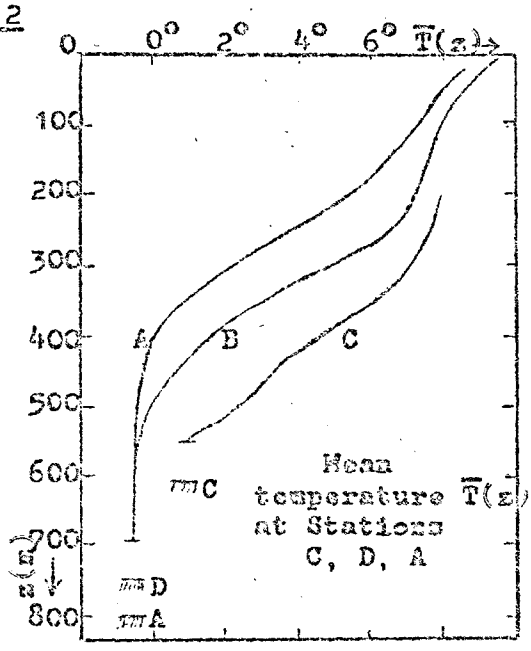
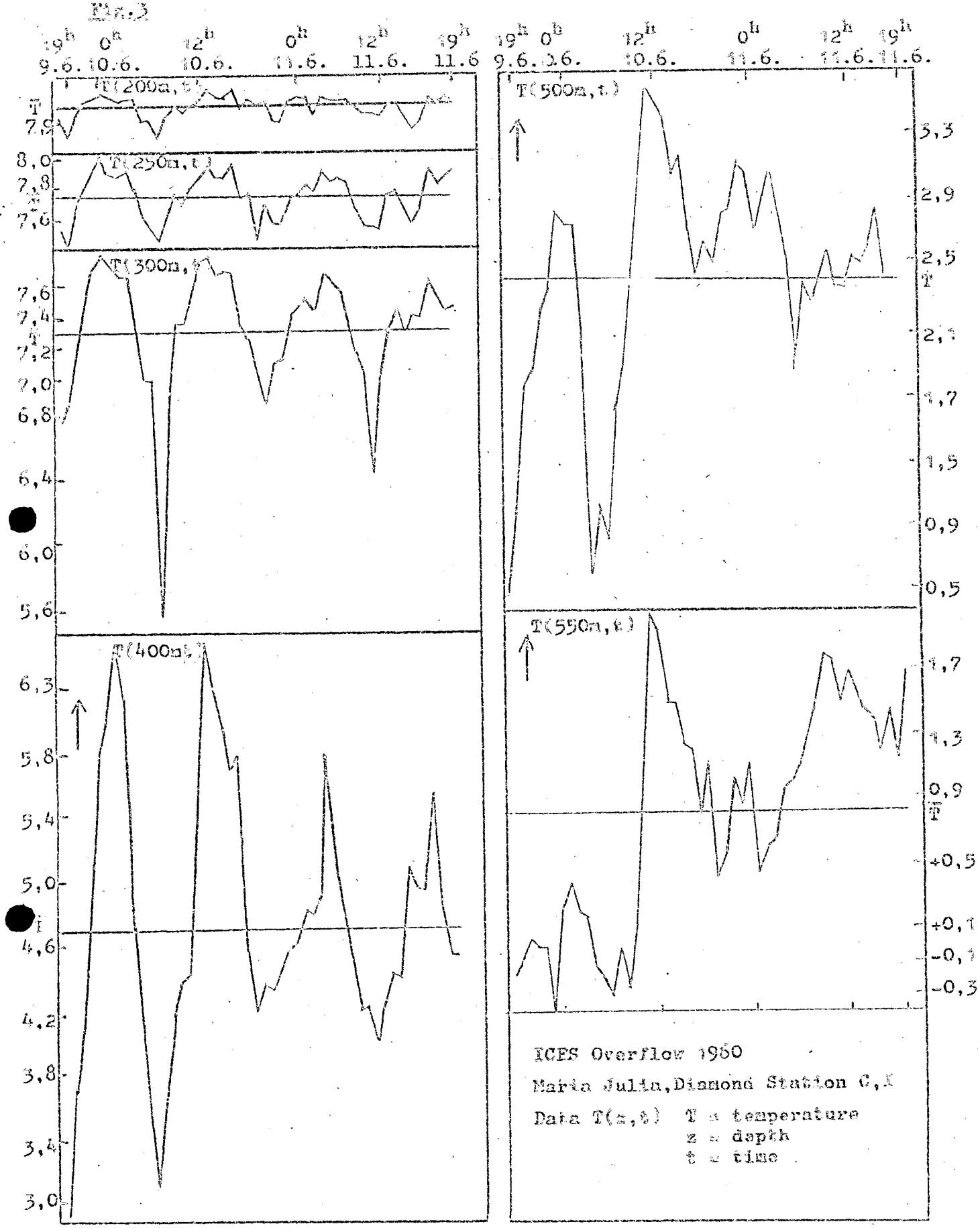
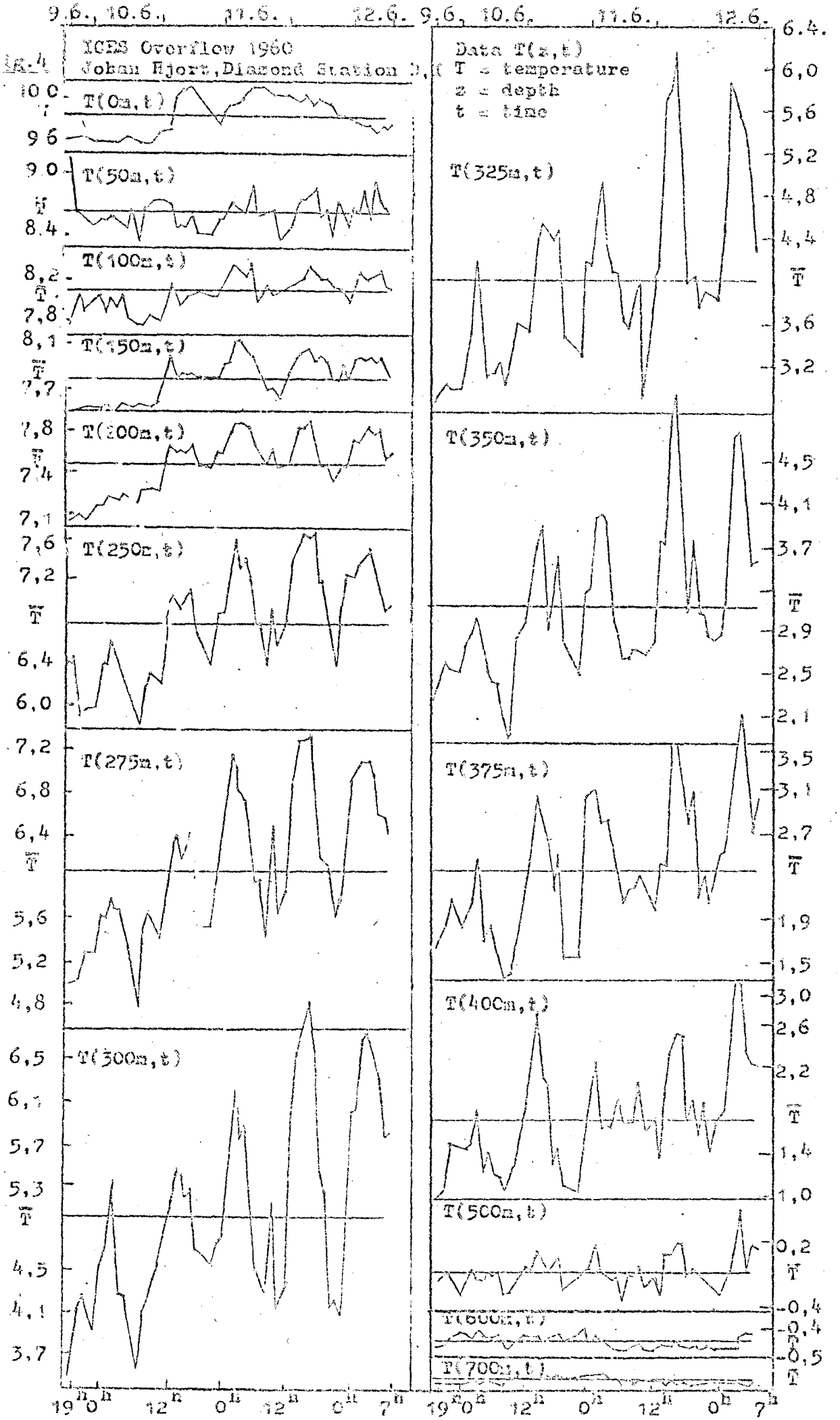
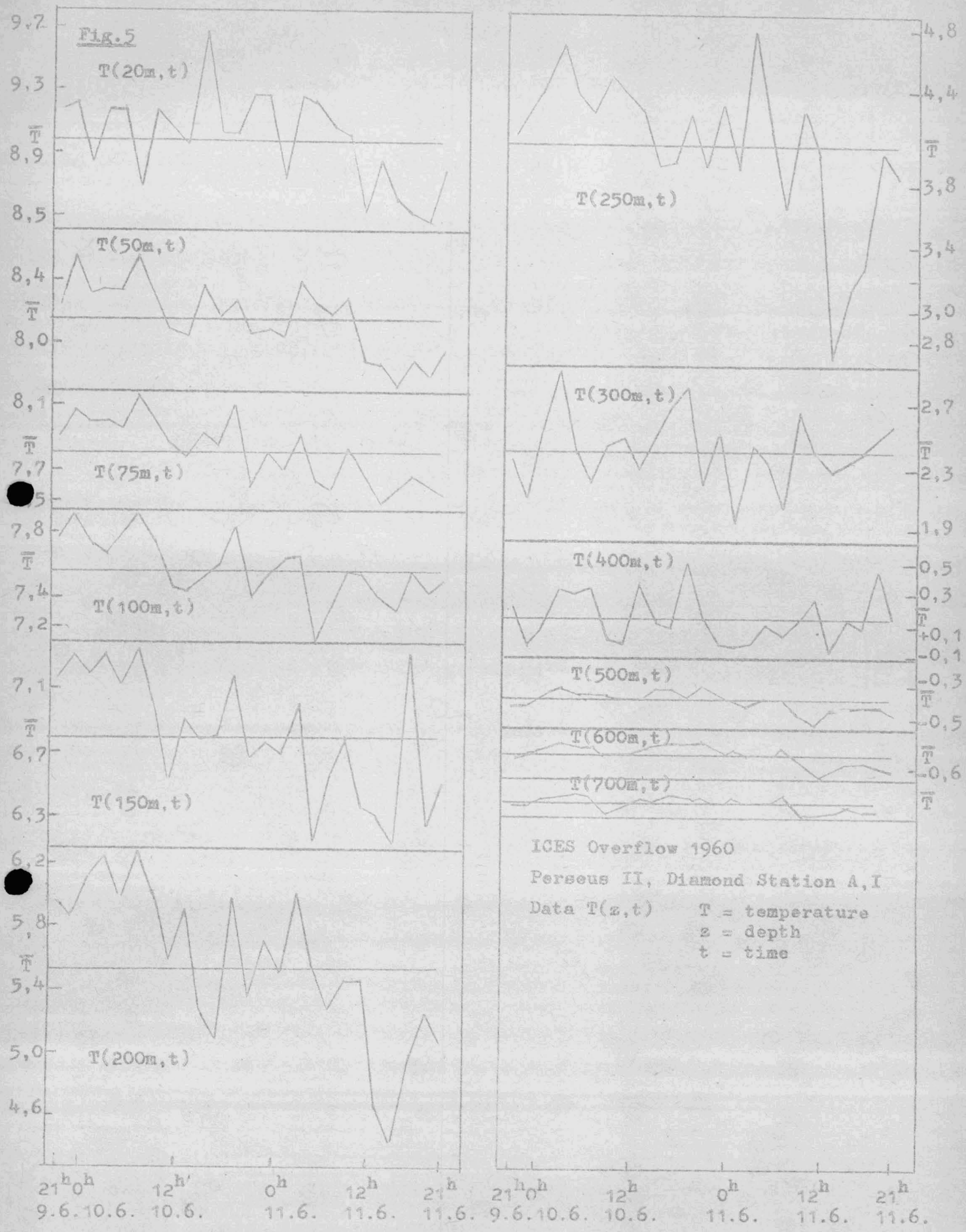

0
0°
2°
4°
6°
T̄(z)
100
200
300
400
500
600
700
800
z
A
B
C
C
D
A
Mean temperature T̄(z) at Stations C, D, A

Fig. 3


19h 0h 12h 0h 12h 19h
9.6. 10.6. 10.6. 11.6. 11.6. 11.6
T(200m,t)
T(250m,t)
T(300m,t)
T(400m,t)
T(500m,t)
T(550m,t)
ICES Overflow 1960
Maria Julia, Diamond Station C,I
Data T(z,t) T = temperature
z = depth
t = time


9.6., 10.6., 11.6., 12.6. 9.6, 10.6., 11.6., 12.6.
ICES Overflow 1960
Johan Hjort, Diamond Station
Data T(z,t)
T = temperature
z = depth
t = time
T(0m,t)
T(50m,t)
T(100m,t)
T(150m,t)
T(200m,t)
T(250m,t)
T(275m,t)
T(300m,t)
T(325m,t)
T(350m,t)
T(375m,t)
T(400m,t)
T(500m,t)
T(600m,t)
T(700m,t)
19h 0h 12h 0h 12h 0h 7h 19h 0h 12h 0h 12h 0h 7h



ICES Overflow 1960

Perseus II, Diamond Station A,I

Data T(z,t) T = temperature
z = depth
t = time

Fig.6

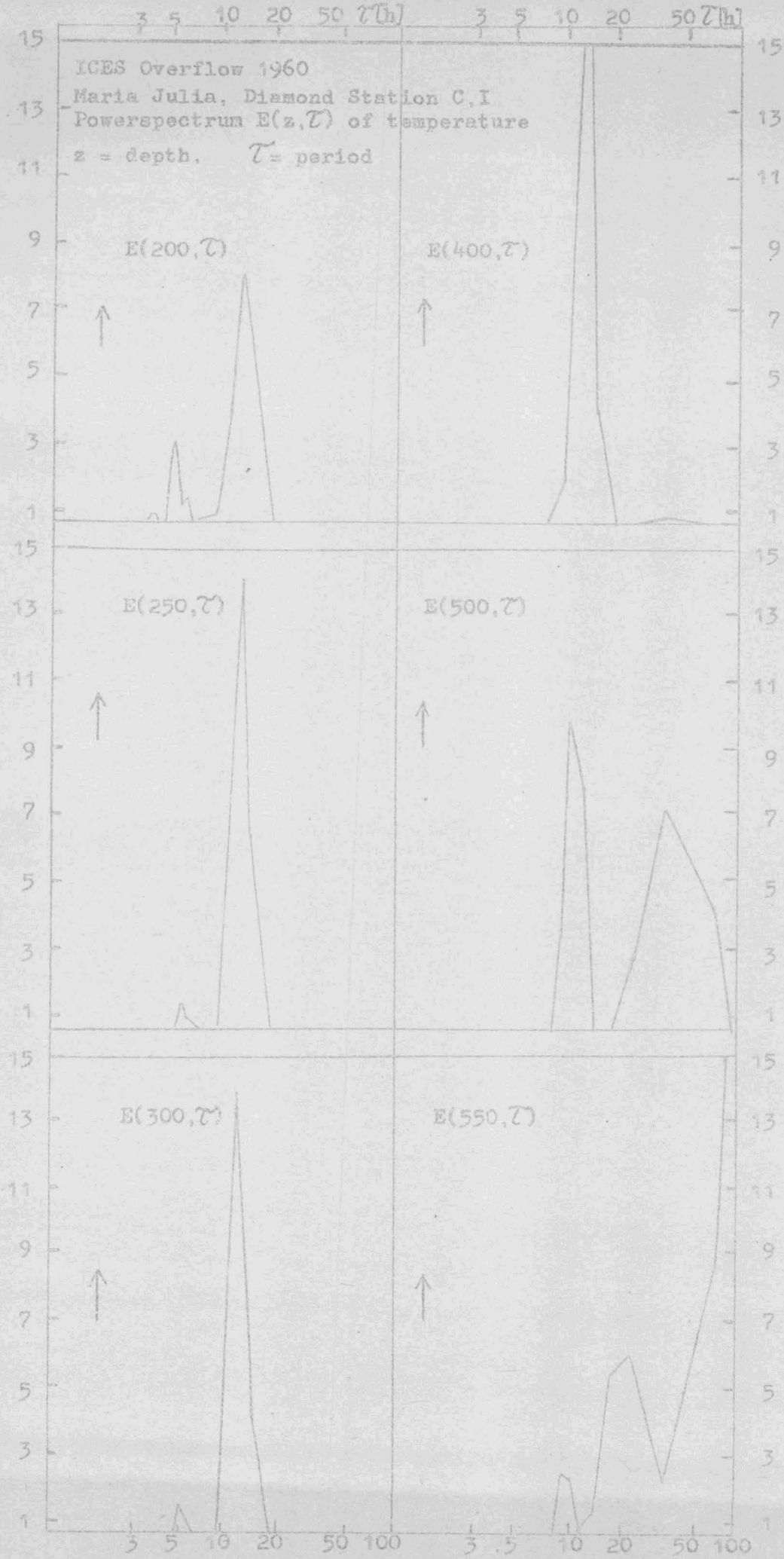

ICES Overflow 1960
Maria Julia, Diamond Station C,I
Powerspectrum E(z,τ) of temperature
z = depth, τ = period
E(200,τ)
E(400,τ)
E(250,τ)
E(500,τ)
E(300,τ)
E(550,τ)
3 5 10 20 50 τ[h]
15
13
11
9
7
5
3
1
100

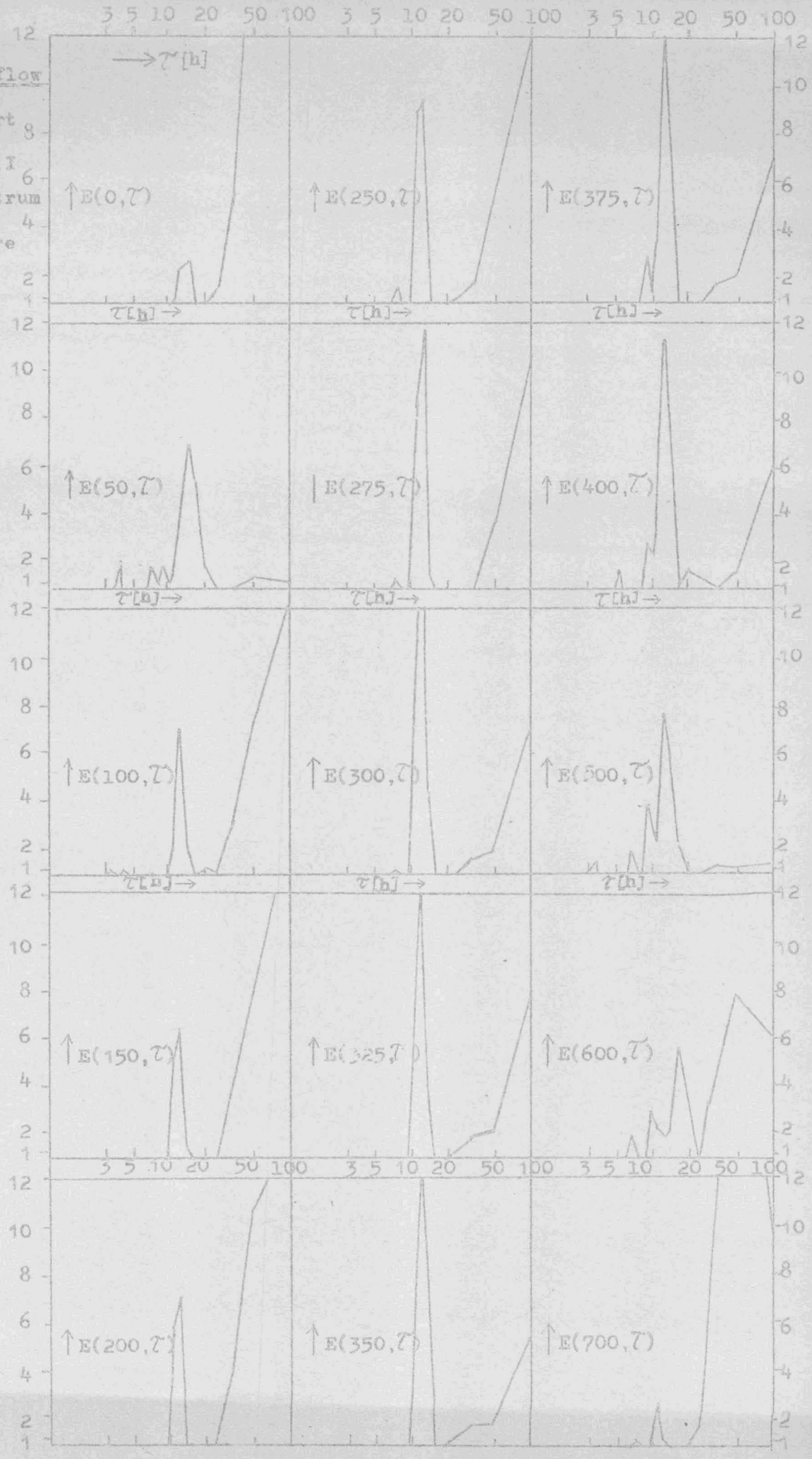
Fig.7

ICES Overflow 1960

Johan Hjort
Diamond
Statior D,I

Powerspectrum $E(z,\tau)$ of temperature

z=depth
τ=period



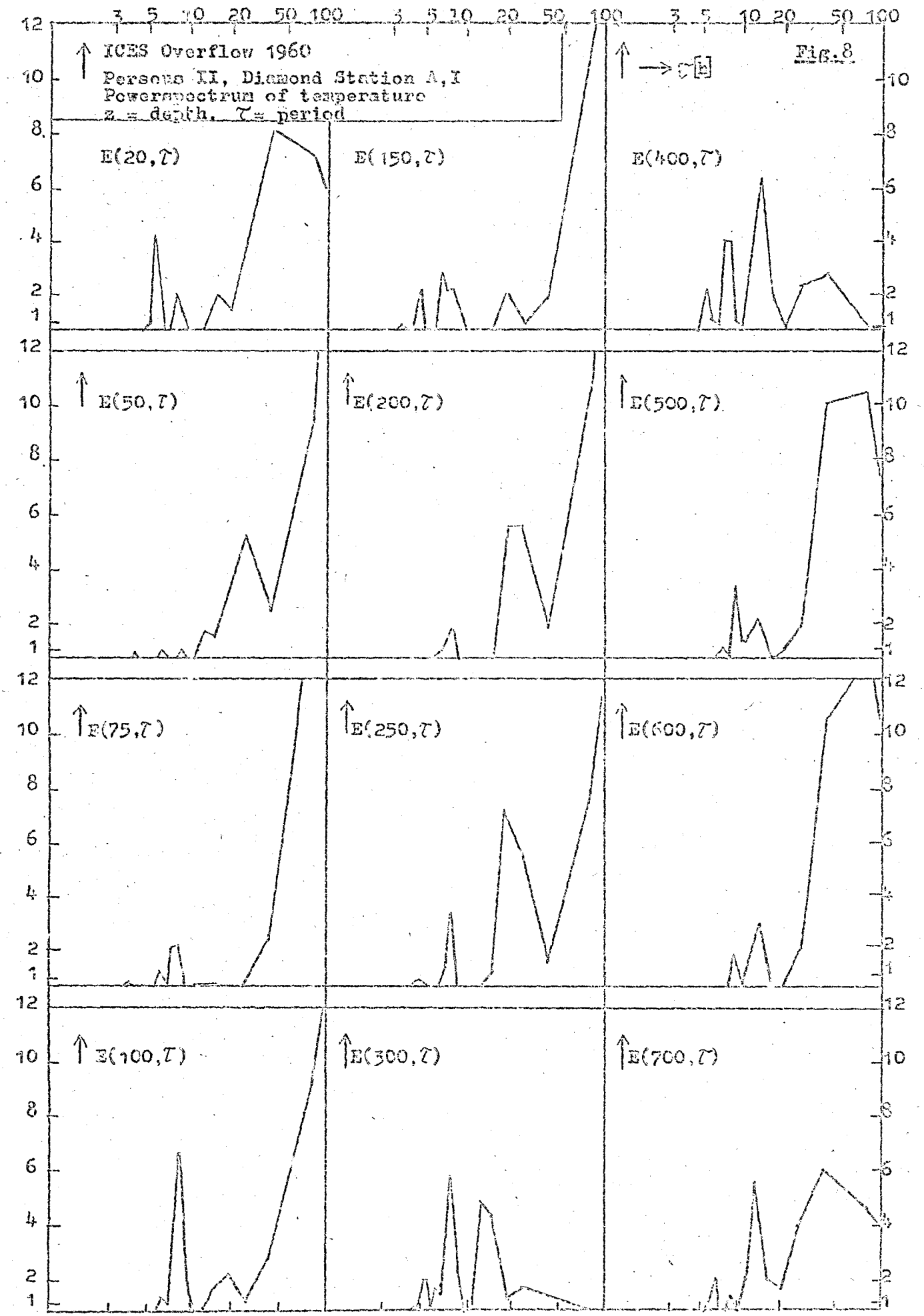

ICES Overflow 1960
Persons II, Diamond Station A,I
Powerspectrum of temperature
z = depth, τ= period
τ[h]
E(20,τ)
E(150,τ)
E(400,τ)
E(50,τ)
E(200,τ)
E(500,τ)
E(75,τ)
E(250,τ)
E(600,τ)
E(100,τ)
E(300,τ)
E(700,τ)
3 5 10 20 50 100

Fig. 8