Date: December 18, 1991
To: EISCAT data representatives
From: Peter Collis
Subject: Common programme result tapes

Data from the following experiments have now been analysed and a tapes containing results in the standard format will be mailed to you when copies have been made (early in the new year). Plots of system temperature and transmitter peak power during these experiments are enclosed.

(1991)

CP-2-D 04/06 Nov (1000 - 1000 UT)
CP-3-F 26/28 Nov (1000 - 1000 UT)
CP-1-I 08/10 Dec (1010 - 1600 UT)

Notes

1. Estimation of peak power from high voltage.

The UHF klystron 102 was replaced by klystron 101 on 15 October. The relation between peak power (PP kW) and high voltage (HV kV) for UHF klystron 101 was re-calibrated and the revisions incorporated into the system (in subroutine TXMONI) on 16 October. The new values are:

PP = 0	HV‹20
PP =-166+8.3*HV	20‹HV‹70
PP = -2455+HV*41	70‹=HV‹80
PP = -2775+HV*45	HV>=80

The minus sign was missing in the expression for HV>=80 for klystron 102 in my note of 18 November. The correct from is:

PP = -2100+HV*35	HV>=80

2. CP-2-D, 4/6 November, 1991.

At the end of this experiment it was discovered that the SIN and COS cables belonging to receiver channels one and three were wrongly connected. This became apparent when the Doppler calibretion for the long pulse showed the test signal at both upshifted and downshifted injected frequencies. The long pulse modulation in CP-2-D uses channels three and four and it is clear that all the long pulse spectra during the experiment were distorted by this quirk. Channel one is used, together with channel two, for the medium-resolution power profile so these results should be as normal. Multipulse results are not affected. It is not known when these cables were interchanged, but the CP-4-A operation on 7-9 October was not affected whereas the fault has been found in data from special experiments on 18 October.

Since it is inappropriate to use results from analyses of these long pulse data they have been excluded from the result tape, with the exception of raw electron density. All other parameters and their errors have been assigned values of -32767, the fit code has been set to -1(to indicate no fit attempted) and

the variances set to zero. The Tromsø results exactly fill one 2400’tape at 1600 bpi. Remote site results follow on the second tape.

3. CP-3-F, 26/28 November, 1991.

The beginning of this operation was plagued by a large number of HV trips caused by high reflected power. Transmission was stopped at 1254 UT on the 26th to permit investigations into the reasons for this. It was found that the potentiomerter which allows the position of the polariser to be set had been damaged by a leak in the hubroom the previous day. The HRPs were apparently being caused by the polariser not being in its correct position. Adjustments were made and transmission commenced again at 1433 UT.Meanwhile,communications with both remote sites had been lost and were not able to be restored until 0910 UT on the 27th. Thus no information on transmitted power was transferred during this interval and a fixed value of 1.2 MW was used for remote site data analysis. However, the signals received at the remote sites were much weaker than they should have been because the polarisation of the trasmitted signals had not been optimised. In fact, remote site signals from the trough region dering the night of 26/27 November were too weak to be analysed. Remote site results from this period are included on the tapes because the available velocity fits may be of some use. Another problem led to further loss of data in this period, however, when the Kiruna antenna failed to move as commanded between 2130 UT on the 26th and 0700 UT on the 27th, but without causing an alarm condition.

The experiment was atopped again at 0800 UT on the 27th to allow the polariser in Tromsø to be correctly fixed; normal operation was resumed at 0843 UT. Two further small gaps occurred in Kiruna near 1045 and 1205 UT on the 27th due to the same antenna problem. Three data gaps occurred dering the final two hours of the experiment because of transmitter problems. The accuracy of the resultant electron densities from the analysis has been confirmed using ionosonde data from Ramfjordmoen.

4. CP-1-I, 8-10 December , 1991.

This experiment followed a three-day run of CP-4 which ended at 1000 UT on December 8 (the CP-4 results will be distributed as part of the next batch). The irregular behaviour of the system temperature is presently under investigation.

Sodankylä experienced software problems on trying to start up CP-1 and eventually had to reload some real-time programmes, joining in the operation at 1100 UT.

A curious feature was observed in the Kiruna data during this experiment, namely a coherent-type signal in the first two gates for E-region positions. Five signal gates are sampled for remote station CP-1 measurements; the timing is adjusted so that the strongest true signal is in the centre (third) gate while some spillover is seen in gates two and four. The unwanted coherent signal, thought to arise from tropospheric scatter, was strongest in gate one for the highest E-region altitudes(125 and 117 km) and strongest in gate two for the lowest altitudes (90 and 96 km). For the intermediate heights (101 and 109 km) it was approximately equally strong in gates one and two, though these ratios may have changed with time. It is lilely that the analysed data have been contaminated by this signal during parts of this experiment, particulatly for the lowest altitudes. Typical signal magnitudes seen in gate one at 124 km altitude were ~2-3% with intermittent spikes reaching 100-200% at times. It is

recommended that these E-region Kiruna results should not be used without careful checking of the raw data, which may help identify uncontaminated periods for detailed studies. Neither the Kiruna F-region data nor any of the Sodankylä measurements were affected by this feature.