

METEOROLOGICAL BALLOONS

1. A probable cause of UAP reports which must be considered is that of radiosondes and their lifting balloons.

2. **Radiosonde Launch Sites** There are eight operational upper air stations in the United Kingdom, just part of a world wide network of some 900. The stations in the UK release helium- or hydrogen-filled balloons four times a day at midnight, midday, six o'clock in the morning and evening. The transmitter, (the proper name is a radiosonde), sends back information about the temperature, pressure and the water content of the upper atmosphere. Wind speed and direction may also determine, either by using a NAVAID system or in some cases, the balloon and radiosonde are followed by radar. The distance the balloons travel away from the launch site is dependent on the wind strength, but they will quite readily reach a height of up to 15 miles (about 80,000ft) above the ground before they burst. The equipment descends on a small parachute.

3. **Size and Shape** The Meteorological Office currently use balloons which are spherical and 1.5 to 2m in diameter at launch. The actual radiosonde is suspended some 30m beneath the balloon and, for visual purposes, can be ignored.

4. **Location** The location of radiosondes, on their lifting balloons, is known from LORAN C; and could be used to eliminate suspected UAP mis-reporting.

5. The location of the release points in the United Kingdom are shown at Figure 1. The incidence of mis-reported radiosondes as 'UAPs' is likely to be higher in the vicinity of these launch sites.

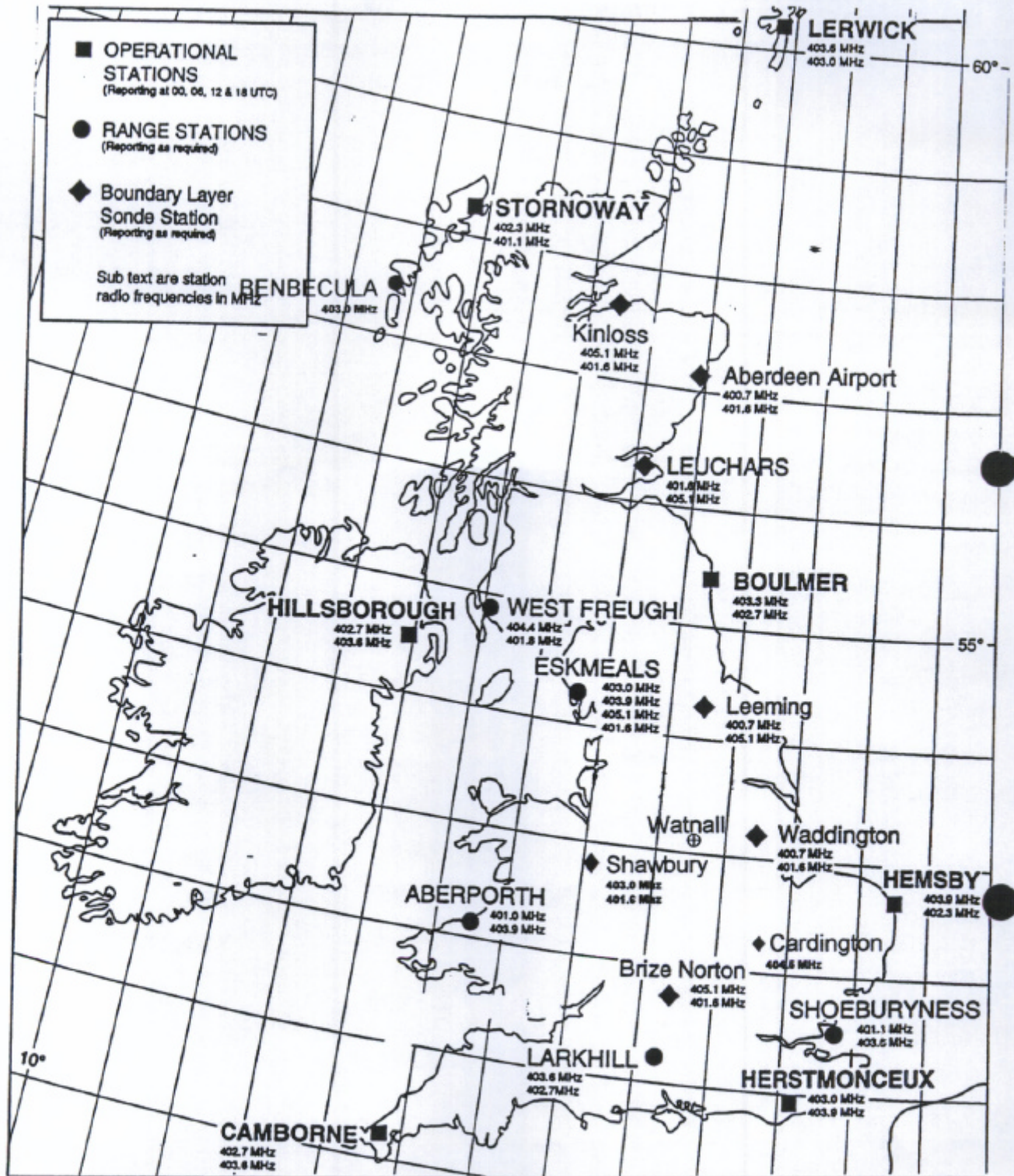


FIGURE 14-1 RADIOSONDE LAUNCH SITES

WORKING PAPER NO. 15

AIRSHIPS , HOT AIR & TETHERED BALLOONS

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AIRSHIPS AND HOT AIR BALLOONS

1. **Object Sizes** Airships and hot air balloons are frequently mis-reported as UAPs, probably because their appearance in the UKADR is still relatively rare in some parts of the country, and the fact that they are at low altitude. However, ballooning is a growing sport and an increase in false alarms from this source can be expected. Both UK-produced and imported balloons can be expected in UK airspace, including balloons of novel shapes (e.g. cylindrical). The situation is enhanced by the fact that balloons are often silent for long periods, and airship engines are relatively quiet. Table 1 shows a selection of typical parameters for airships. Balloon diameters are typically 22m with a height of 26m. The use of gas burners at night is a particular source of reports of 'glowing spheres', particularly in Southern England.

2. **Report Incidence** If a number of design proposals proceed, the incidence of both cargo and passenger airships can be expected to increase; however, their appearance will still be relatively rare to most observers, compared with other familiar air-objects such as aircraft and gliders.

3. **Meteorological Balloons** These are described at Working Paper No 14.

4. **Tethered Balloons** While tethered balloons are less likely to be mis-identified as a UAP, by stationary observers, an observer in a moving vehicle may catch a glimpse of a tethered balloon in the appropriate weather and lighting conditions and submit an event report. In the UK, tethered balloons of up to 20ft in diameter may fly up to 200ft AGL, without tether streamers (the presence of streamers

would almost certainly have eliminated many false reports).

5. It should, however, be noted that the presence of a tethered balloon may, in fact, attract an atmospheric UAP which is seeking an attracting electrical potential, since a charged mass of air may be attracted to the balloon or it's tether.

6. Tethered balloons may remain in one position for up to 10 days.

	Length (m)	Diameter (m)	Height (m) ^[1]
Skyship P600	59	16	20
USA	17	5.5	6.77
USA	39	10	-
USA	25	8	-
USA	67.5	16.7	20.2
COLT	34	12.5	-
UK	30	11	-
GERMANY	68	14	-

TABLE 1 EXAMPLE BALLOON DIMENSIONS

Note [1] Including Gondola

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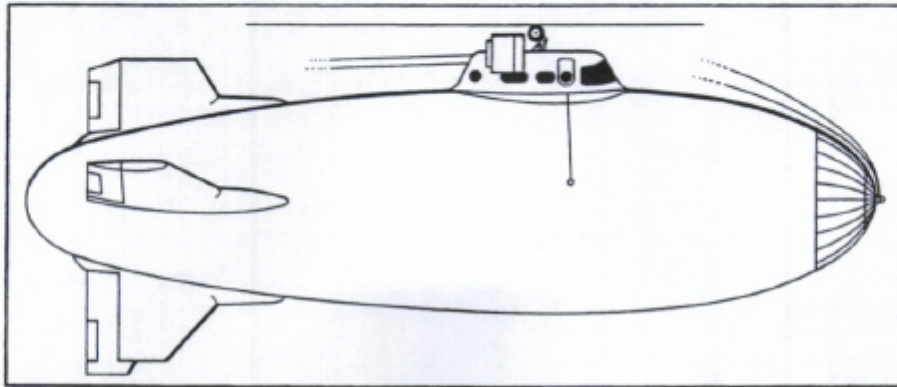


Figure 1 Design Drawing for the DKBA-800 Passenger/Cargo Airship

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WORKING PAPER NO. 16

SUNSPOT, AURORA AND SEISMIC CORRELATION

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SUNSPOT, AURORA AND SEISMIC CORRELATION

1. **Solar Cycle** At the commencement of the UAP study it was recognised that the UAP enigma, which has apparently been present in some form for recorded history, might be due to a simple natural explanation. However, it is only in the last 50 years that an increasingly large number of UAP sightings have been recorded. While it was recognised that the phenomenon may eventually be shown to be due to a combination of natural events, rather than a single cause, the solar cycle is one of the more obvious candidates for investigation. The frequency of occurrence of UAP reports against known earth phenomena, such as solar activity, has been checked. However, as this transient solar phenomenon repeats in an eleven (~11.4) year cycle, long-term statistical comparison will not be possible unless a very large spread of UAP events are entered into the database and, clearly, it would not be viable, purely in the interests of Defence Intelligence, to do so. Investigations, reported in Volume 1 of the Study, were necessarily limited to monthly comparisons taken over a year. No direct correlation was found for solar flux or sunspot number. This does not mean that, in the future, there will not be shown to be some weak correlation, connection or contribution, when taken together with other natural effects

2. One of the reasons for considering sunspot correlation is because the cycle seems to derive from a more fundamental 23 year magnetic periodicity on the sun and, it has been suggested, in some quarters, that UAP and magnetic activity are connected in some way on the earth. The solar magnetic cycle has a period approximately twice that of sunspot (flare) activity. The electromagnetic emissions from the sun vary in power, penetrating power, degree of fluctuation and intensity distribution over the earth. The direct effects of electromagnetic radiation are confined to the sun-lit hemisphere of the earth. During each new 11 year cycle the

polarity of the pattern of magnetic activity reverses.

3. Within the 11/23 year cycle, solar surges appear (solar flares) which produce complex magnetic fields. Therefore, even to make correlations between the frequency of UAP reports and spurious magnetic activity will require at least several years of reports in the UAP database - or ideally, a filter to remove identifiable distractors, such as aircraft. Figures 2 to 4^[1] show portion of the solar cycles 21-23. Cycle 21 started in June 1976, Cycle 22 in September 1986 and Cycle 23 (the current Cycle) in May 1996. It is clear that to carry out any meaningful statistical analysis a the dat for a lengthy period of UAP sighting reports is required. As an initial sample the daily measurements were obtained for the period 1986-1996 and used for correlation studies reported at Volume 1.

4. Proof of the postulated UAP-solar connection may be difficult to confirm even if all the statistics were available because it must be remembered that UAP statistics will have been significantly skewed in the more recent decades by the addition of airships, aircraft, satellites, etc. to the reasons for sightings (i.e. man-made events).

5. **Auroral Phenomena** Magnetic and auroral phenomena (M-Region disturbance) occur at 27 day intervals over months or even years (Figure 1). These recurrent effects are most prevalent during the last three to four years of the 11 year cycle - unexpectedly when normal sunspot activity is low. The terrestrial effects are much less vigorous than the effects caused by flares, but they can last several days, reaching a peak when the earth is at its greatest distance above or below the plane of the sun's equator.

CORRELATION OF UAP EVENTS WITH SEISMIC ACTIVITY

6. On the assumption that major luminous events are also connected with seismic activity, it should be possible to correlate this coincidence if enough UAP event evidence is available to compare with seismic records. The rationale for supposing that seismic (structural) strain causes luminescences is described (Working Paper No. 10). If this were a reliable guide then the onset of a set of UAP events could possibly be predicted! There are, however, several problem areas:

- The number of UAP events which are clearly luminous/earthlight-related, must first be separated from all other UAP sightings.
- The UK land-mass suffers serious seismic activity only at a low rate but hundreds of low-magnitude events occur which must influence rock-stress conditions from day to day.
- The UK distribution of probable 'earthlights' cannot be expected to be evenly spread because of the variability of the geological structure and sporadic reporting; as many of the rocky areas of the UK are in sparsely populated areas.

7. Persinger^[3] has analysed luminosity events across Europe (Six nations) using reports taken over a 100 year period (1820-1920), where it is shown that the years of peak earthquake activity were also the same years of maximum UFO reporting. While this type of analysis could be made for the period for which the Department hold UAP reports (1967-1997), some of the early reports are limited in number and sparse in detail, and a more realistic approach is to take a ten year sample (1987-1997), where the statistical value will be higher. Distinct UAP-Earthquake to Fault-line

links were found with UAP, in a French investigation as long ago as 1960. It has already been established elsewhere in this study that UAP events may be due to many different effects, no possible cause must be ignored.

TECTONIC ELEMENTS OF THE UK

8. As an aid to possible future analysis of UAP events, the UK earth-fault system has been briefly investigated. The most useful reference for this purpose is at [4]. A full database should enable UAP location correlations to be made with this fault map if seismic activity is the cause. It is assumed that if earthlights are formed at or near fault positions they may travel some distance (e.g. 10km or more) before dissipating. Under some circumstances (e.g. attachment to a charged body such as an aircraft), they may travel much further, depending on air target velocity.

9. The total annual release of energy in the world's earthquakes corresponds to up to 10^6 kW and although the largest earthquakes account for most of the seismic release it is assessed that ~20,000 small quakes occur. A moderate earthquake generates $\sim 10^5$ watts per square metre and a fault rupture $\sim 10^{14}$ watts. No trigger mechanism has been discovered to predict earthquakes reliably (in which case this might also act as a warning for expected UAP reports due to earthlights (see Working Paper No. 10)) Many events exhibit the property of 'dilatancy', for example, (i.e. an increase in volume during deformation). This, in turn, causes an increase in frictional forces and a change in resistivity/electrical conductivity, which, in turn, must affect the production of early, but small, seismic movements (said to be detected by animals in advance of human detection systems/instruments and a precursor to earthlights).

10. Commercial data is available (at a small cost) to support further investigations, if required.

[1] SIDC Brussels at www.dxic.com/spolar. J Alvested. 1988

[2] British Geological Survey,
Edinburgh

[3] Persinger M.A.
"Geographical Variables and
Behaviour" Laurentian
University Canada (1983)

[4] Underhill J. R. et al " The
Dent Fault System....." Journal
of the Geographical Society,
London Vol 145,(1988)

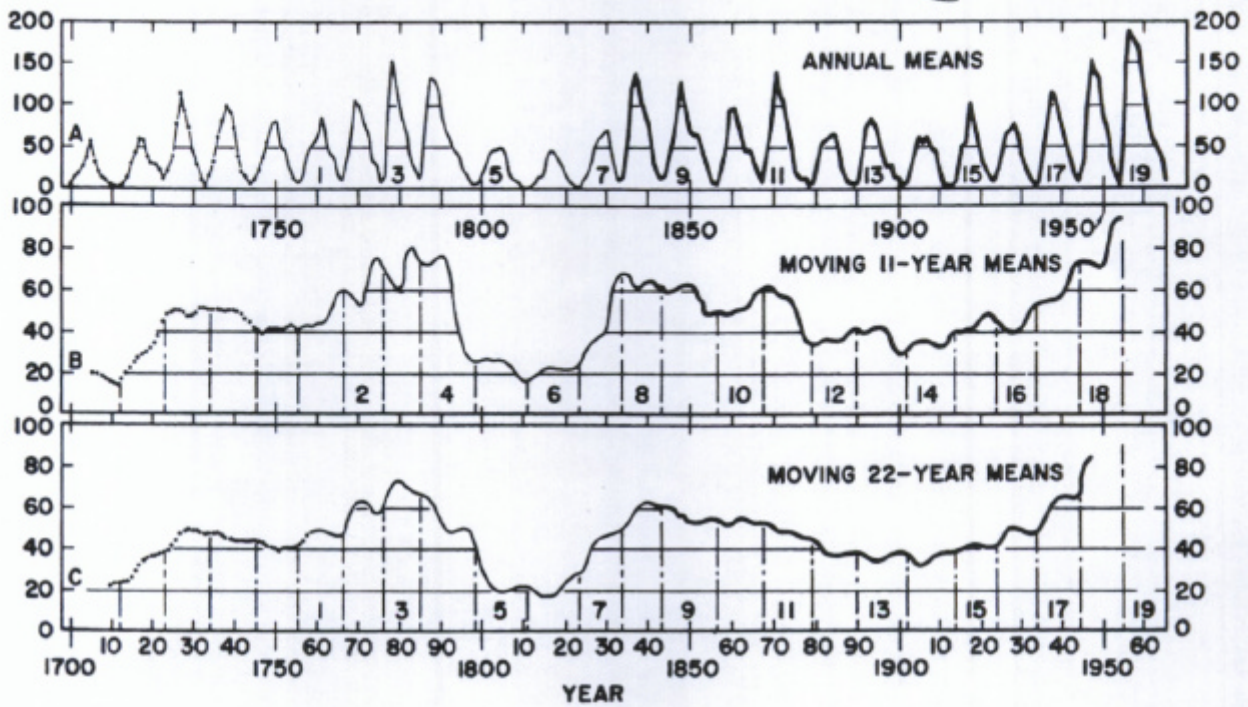


FIGURE 1: MEANS OF RELATIVE SUNSPOT NUMBERS, 1700 TO 1960¹

¹ HANDBOOK of Geophysics and Space Environments Air Force Cambridge Research Laboratories.

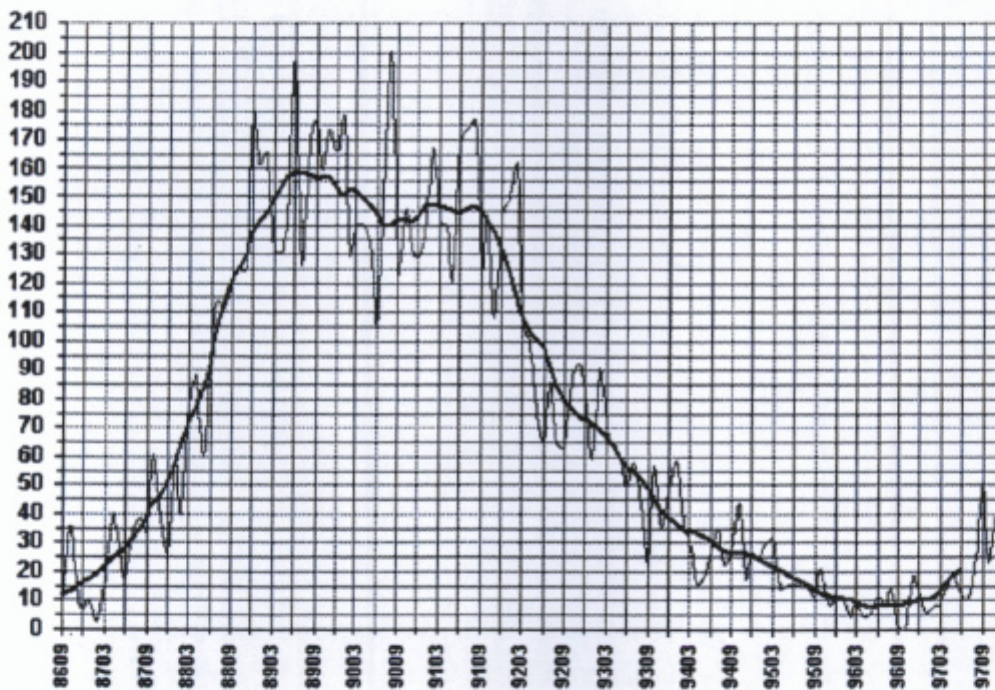


FIGURE 2: SOLAR CYCLE SUNSPOT NUMBERS (CYCLES 21-23)

Note: The heavy curve is a smoothed approximation. In the UAP context finer grain required (Figure 3)

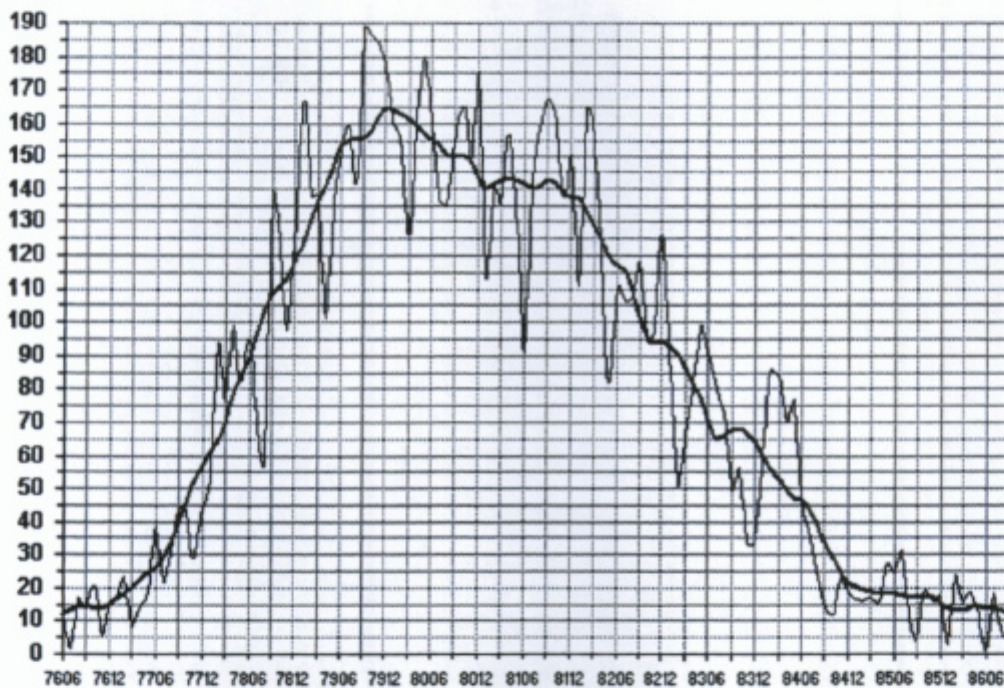


FIGURE 3: SOLAR CYCLE No 21(1976-1986)

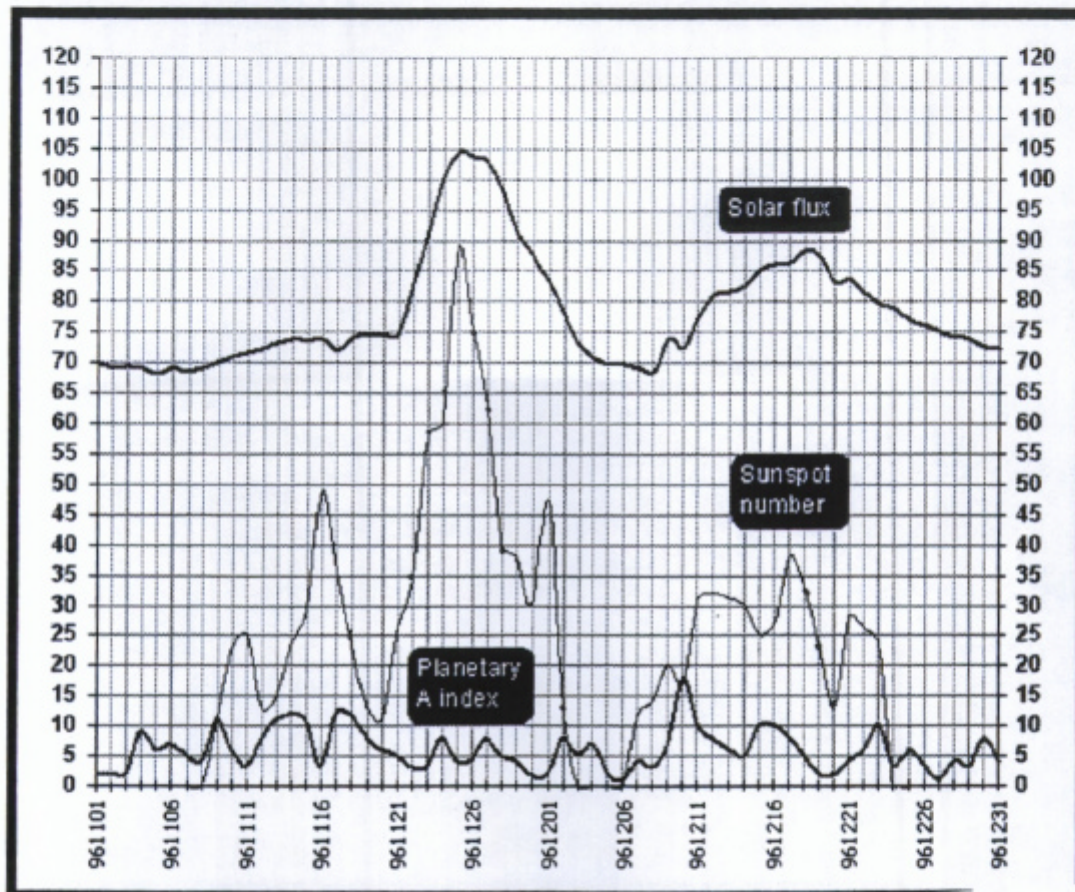


FIGURE 4: EXAMPLE DETAILED SOLAR FLUX/SUNSPOT NUMBERS
FOR JAN/FEB 1996 (U)

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