

Mrs. J.M. Hopwood commented that the difference in area between the lake and the swamp could have an effect on the evaporation, particularly if the "oasis effect" is considered relevant.

R.R.B.

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SOME RESULTS OF THE METEOROLOGICAL ROCKET FIRINGS

By F.H. Callus

Mr. Callus of the Bureau of Meteorology, Melbourne, presented the details and results of a series of comparative meteorological rocket firings carried out at Woomera from September to December of 1968. This series was the result of a decision by an inter-departmental committee (WRE and Bureau of Met.) to conduct comparative field trials of the English SKUA rocket dropsonde system and the Australian KOOKABURRA rocket dropsonde system, in order to determine which would be the most suitable system for a possible regular sounding program to be run by the Bureau of Meteorology.

The aims of the trials were:

- (1) to compare sensors,
 - (2) to test the rockets,
 - (3) to test the associated ground equipment,
- and (4) to study the possibility of using Bureau personnel and equipment in a future program.

Both rocket systems eject their dropsonde payload at an altitude of about 70 km. In both systems the payload consists of a temperature sensor, associated telemetry and a parachute. Tracking of the payload by a modified WF44 radar could be used to determine the upper atmosphere winds down to 30 km.

Mr. Callus described the rockets and their associated equipment, and discussed the data reduction in some detail, with particular emphasis on the digital smoothing of the data. He explained that the firings were conducted in pairs (a SKUA and a KOOKABURRA firing an hour or less apart) separated by periods of from 2 to 6 weeks. In subsequent slides he presented the results of E-W and N-S wind components and the temperature profiles in their appropriate pairs for comparison, together with results from balloon ascents to 35 km.

In general the results compared well with similar Northern Hemisphere data obtained at White Sands and Cape Kennedy, U.S.A. There appeared to be no systematic difference between the SKUA and KOOKABURRA sonde results, except that at the lowest altitudes (30-35 km) the KOOKABURRA temperatures were slightly lower than the SKUA and balloon temperatures - Mr. Callus suggested that this was due to the blocking oscillator transistor of the telemetry system. There was

sufficient similarity between certain of the fine scale features to confirm their reality and to indicate that other fine-scale differences were real, i. e. were due to the 1 hour time difference between firings, and were not instrumental.

Mr. Callus pointed out that the SKUA temperature sensor (a spiral fine wire resistance thermometer) had a better time response than the KOOKABURRA thermistor beads - 1 second as opposed to 4 seconds at 60 km - and that the SKUA parachute was somewhat easier to track. However, the SKUA sonde oscillated considerably, about 65 degrees either side of vertical. This could be deduced from the amplitude variation of the telemetry signal, and seen in the movie film taken on one flight where upward and sideways looking cameras replaced the dropsonde. Wind tunnel tests in U.K. have indicated that such oscillations would lead to variations in the dynamic heating correction factor of about one degree. This was observed strikingly in the case of the sixth SKUA firing as a ripple on the initial (upper level) part of the temperature profile. Such oscillation might also lead to difficulty in applying radiation corrections to the temperature profiles.

In the discussion, Mr. Phillipot asked if time-height cross sections could be obtained from the firings actually made. Mr. Callus pointed out that possible diurnal variations would perhaps invalidate any such investigation as the pairs of firings were not conducted at the same time of day. He said, however, that the most probable time of the west-east change-over agreed very well with the northern hemisphere White Sands findings.

Dr. Gibbs enquired about the effectiveness of the WF44 radar and which of the two systems would be more suitable for handling by Bureau personnel. Mr. Callus replied that it would of course be better to use a more accurate radar, but the WF44 was adequate. From the point of view of the Bureau, it was probable that the KOOKABURRA system (with perhaps the SKUA temperature sensor) would be easier to handle and would give better results. In subsequent discussion, no estimate of relative cost was given.

In conclusion Dr. Tucker thanked and congratulated the speaker. In his remarks he pointed out that implementation of any future program would depend very much on the type and value of the data now becoming available from remote sensing satellites.

G. W. P.