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AN EXAMPLE OF A TYPE B MATURE WINTER STORM

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INTRODUCTION

THE ADVENT OF REAL-TIME SATELLITE PHOTOGRAPHS IN THE FORECAST OFFICES CONTINUES TO PROVIDE THE METEOROLOGIST WITH A PANORAMIC VIEW OF THE ALPHA AND OMEGA OF WEATHER SYSTEMS.

AT THE PACIFIC WEATHER CENTRE, TO AMELIORATE OUR UNDERSTANDING OF ATMOSPHERIC PROCESSES, WE OFTEN DOCUMENT THOSE SATELLITE PICTURES ILLUSTRATING INFORMATIVE CLOUD PATTERNS.

IN THE LITERATURE OF SATELLITE IMAGERY TWO BASIC CLOUD PATTERNS OF MATURE WINTER STORMS ARE RECOGNIZED. THE GENERAL STRUCTURE AND EVOLUTION HAS BEEN DESCRIBED (SEE WELDON, 1975).

FIRST A BRIEF DISCUSSION FOLLOWS ON THE TWO TYPES OF STORM CONFIGURATIONS.

MATURE WINTER STORMS

THE TWO STORM CONFIGURATIONS ARE DENOTED AS TYPES A AND B (FIGURES 1 AND 2 RESPECTIVELY). IT SHOULD BE EMPHASIZED THAT THE DIAGRAMS ARE INTENDED TO PORTRAY THE PRINCIPAL FEATURES OF THE MATURE CYCLONE. IN ACTUAL CASES CONSIDERABLE DEVIATION MAY EXIST.

EXAMING THE FIGURES, WE NOTE THAT THE BASIC DIFFERENCE BETWEEN THEM IS IN THE CIRROSTRATUS DECK. IN TYPE A THE BACK EDGE OF THE CIRRUS CROSSES OVER THE LOWER LEVEL COMMA PATTERN AND NOT IN TYPE B. FURTHER IN CONFIGURATION B THE RIDGE (OR THE MAXIMUM WINDS AXIS) "WRAPS" MORE ABOUT THE LOW CENTRE. PROBABLY THE DIFFERENCE MAY BE EXPLAINED BY THE DEGREE OF VERTICAL DEVELOPMENT. FOR A TYPE B STORM THEN, THE UPPER TROPOSPHERIC RIDGE AND WARMER AIR HAS CURVED MORE SO THAN FOR A TYPE A STORM INTO THE CYCLONIC CIRCULATION.

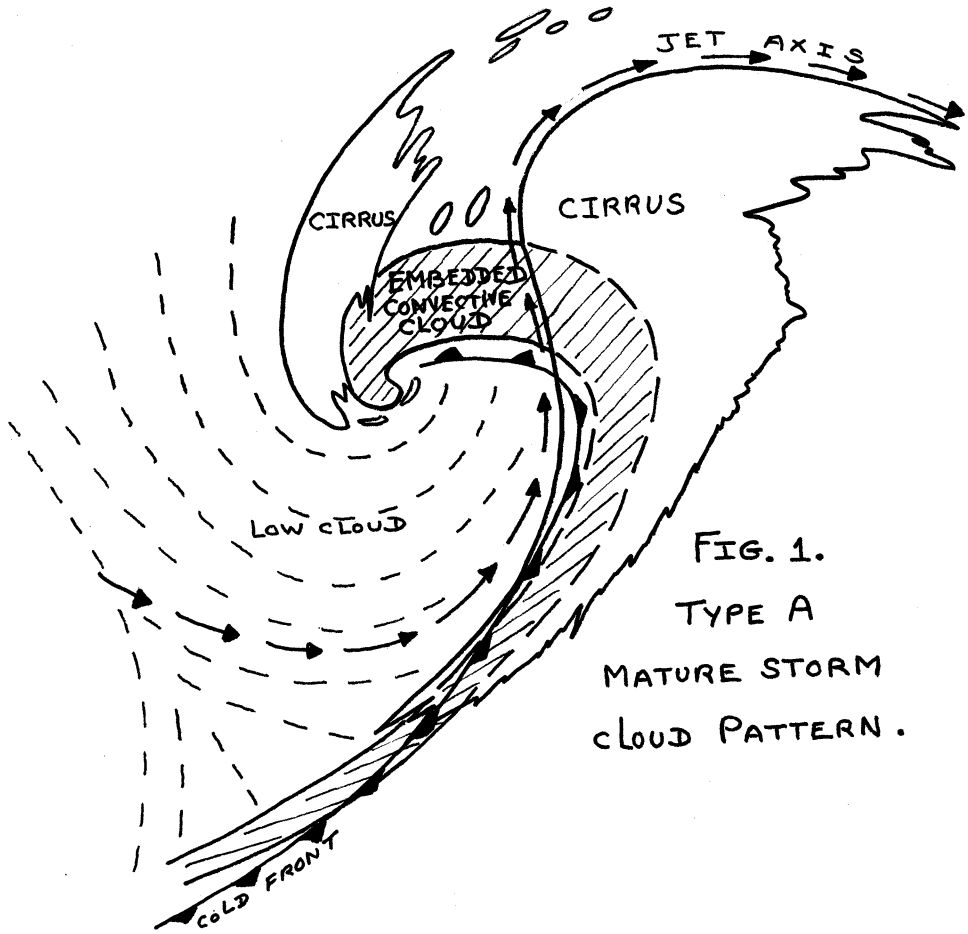

FIG. 1.
TYPE A
MATURE STORM
CLOUD PATTERN.

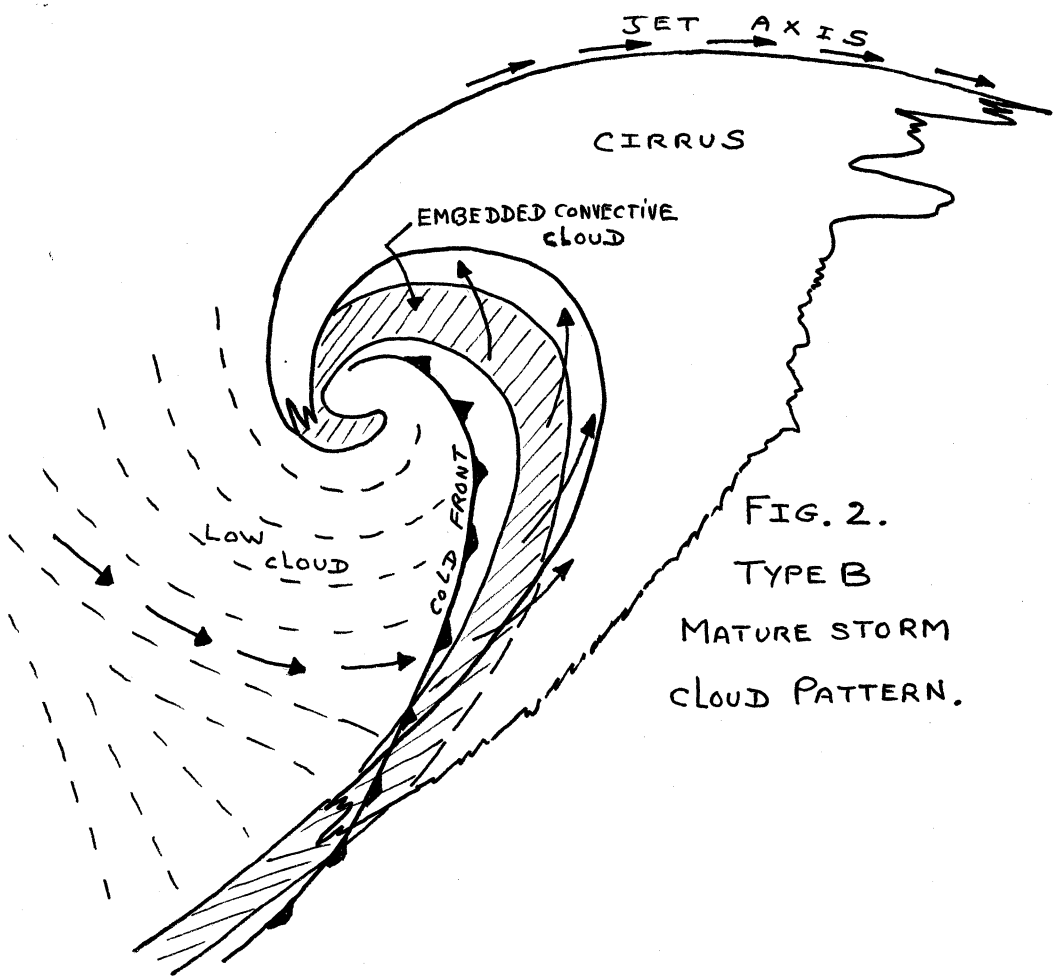

FIG. 2.
TYPE B
MATURE STORM
CLOUD PATTERN.

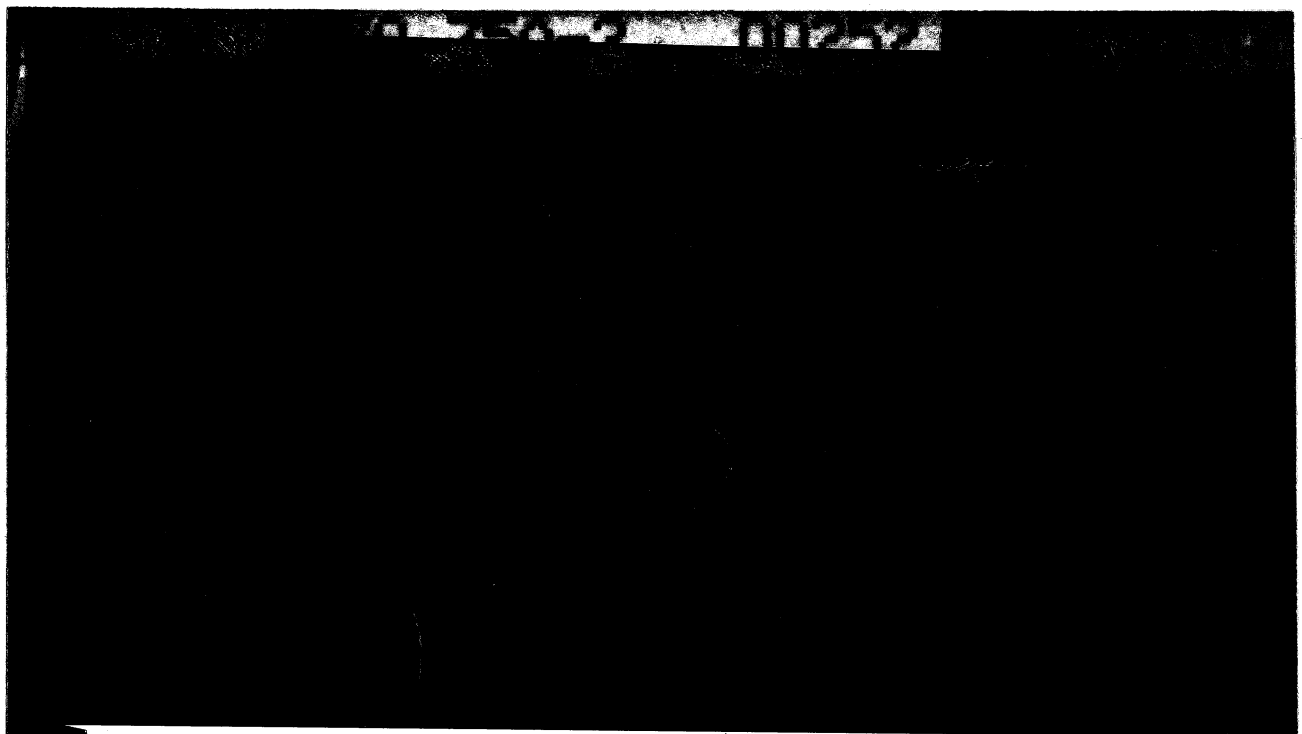

FIG. 3. SATELLITE PICTURE FOR NOV. 17, 1978 AT 1945 GMT. A MATURE WINTER STORM TYPE "B".

DISCUSSION

COMPARING FIGURES 2 AND 3, WE NOTE A FAIR SIMILARITY BETWEEN THEM. SOME PERTINENT BOUNDARIES HAVE BEEN DELINEATED ON FIGURE 3 IN ORDER TO FACILITATE THE COMPARISON.

IN THE EXAMPLE THE DISTURBANCE IS EXTENSIVE AND SEEMS TO PENETRATE WELL INTO THE UPPER TROPOSPHERE WITH THE RIDGE WELL WRAPPED ABOUT THE CENTRE. THE HIGHER LEVEL CLOUD DECK HAS "RUN OUT" AHEAD OF THE MIDDLE LEVEL COMMA. ALSO THE EDGE OF COMMA AND THE CIRRUS DECK DO COINCIDE FOR THE NORTHERN PART BUT A CLEAR SEPARATION EXISTS ALONG THE COMMA TAIL SECTION. THE "CAULIFLOWER" APPEARANCE JUST AHEAD OF THE COLD FRONT IS INDICATIVE OF EMBEDDED CONVECTIVE CLOUD. FURTHER SOUTH ALONG THE COMMA TAIL THE REAR EDGE OF THE CIRRUS BLANKET AGAIN MERGES WITH THE LOWER CLOUD ASSOCIATED WITH THE COMMA TAIL.

IN ADDITION, THE PHOTOGRAPH ILLUSTRATES ANOTHER USEFUL FEATURE, NAMELY THE PLACEMENT OF A SURFACE LOW OVER DATA SPARCE AREAS USING SATELLITE IMAGERY. FOR A MATURE CYCLONE ESPECIALLY THE SURFACE LOW POSITION MAY CLOSELY APPROXIMATE THAT OF THE CLOUD ROTATION CENTRE (DENOTED BY L ON FIG. 3).

ACKNOWLEDGEMENTS

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REFERENCES

WELDON, R.B., APRIL 1975, COURSE NOTES NWS SATELLITE TRAINING.