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PLACEMENT OF LOW LEVEL RIDGE LINES USING SATELLITE IMAGERY

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METEOROLOGICAL ANALYSTS TEND TO BE OBSESSED WITH THE CORRECT PLACEMENT OF TROUGHS AND "FRONTS" AND NEARLY ALWAYS GIVE LOWER PRIORITY TO THE CORRECT PLACEMENT OF RIDGE LINES. USUALLY STREAMLINE RIDGES AND PRESSURE RIDGES ARE EITHER COINCIDENT OR ARE IN VERY CLOSE PROXIMITY TO EACH OTHER. MOTION OF STREAMLINE RIDGES CAN BRING ABOUT CHANGES IN SEVERAL IMPORTANT WEATHER PARAMETERS. FOR EXAMPLE THE CHANGE OF LOW LEVEL CLOUD FROM OPEN CUMULUS TO STRATOCUMULUS TO STRATUS AS THE RIDGE LINE APPROACHES, PASSES OVER AND MOVES EAST OF AN OBSERVING SITE IS A GOOD EXAMPLE. SURFACE WINDS USUALLY SHIFT FROM NORTHWEST ON THE EAST SIDE OF THE RIDGE TO SOUTHEAST ON THE WEST SIDE OF THE RIDGE. THIS CAN BE IMPORTANT FOR BOTH TEMPERATURE AND MARINE WIND FORECASTS. THE FOLLOWING IS AN EXAMPLE OF HOW SATELLITE IMAGERY CAN SOMETIMES BE USED UNDER CERTAIN CONDITIONS FOR THE CORRECT PLACEMENT OF LOW LEVEL RIDGE LINES.

WHEN TWO MID LATITUDE CYCLONES MOVE INTO CLOSE PROXIMITY OF ONE ANOTHER, A "SHARP" RIDGE IS USUALLY FOUND BETWEEN THEM. (A GOOD EXAMPLE WAS EVIDENT THE AFTERNOON OF MARCH 30 OFF THE AMERICAN WEST COAST SEE FIGURE 1). WEST OF THE RIDGE LINE THE WIND FLOW IS SOUTHERLY. WARMER AIR IS ADVECTED NORTHWARD OVER COOLER WATER. THIS RESULTS IN A STABLE LOWER LEVEL ATMOSPHERE. THE CLOUD PRESENT THERE IS STRATUS OR STRATOCUMULUS. EAST OF THE RIDGE LINE, COOLER AIR IS ADVECTED SOUTHWARD OVER WARMER WATER. THIS RESULTS IN AN UNSTABLE LOW LEVEL ATMOSPHERE AND CONVECTION RESULTS. THE VERTICAL DEPTH OF THE CONVECTION INCREASES AS THE AIR MOVES FURTHER INTO THE REGION OF THE DOWNSTREAM UPPER TROUGH.

THE DIFFERENT CHARACTERISTICS OF THE LOW LEVEL CLOUD ABOUT THE RIDGE LINE ARE USUALLY READILY OBSERVABLE ON SATELLITE PICTURES. THIS MAKES POSSIBLE THE ACCURATE PLACEMENT OF THE RIDGE LINE. FIGURE 1 IS A VISUAL SATELLITE PICTURE TAKEN 2315Z, MARCH 30, 1978. THE INDICATED LINE MARKING THE WESTWARD EDGE

OF THE CUMULUS CLOUD MAY BE COMPARED WITH THE RIDGE LINE OBTAINED FROM CONVENTIONAL SURFACE OBSERVATIONS. (SEE FIGURE 2.) THE TWO ARE IN CLOSE AGREEMENT. IT MUST BE REMEMBERED THE THE FORMER INDICATES THE STREAMLINE RIDGE LINE AT CLOUD LEVEL WHILE THE LATER INDICATES THE PRESSURE RIDGE LINE AT THE SURFACE.

THE BEST SATELLITE IMAGERY THAT CAN BE USED IN PLACING RIDGE LINES IS THE VISUAL PICTURES. CIRRUS IS VERY TRANSPARENT TO SHORT WAVE (VISABLE SOLAR) RADIATION AND THE LOWER CLOUD (WHICH IS USED IN "FIXING" THE SURFACE RIDGE LINE) IS RELATIVELY UNOBSCURED. THE INFRA-RED PICTURES "SHOW" THE THIN CIRRUS MORE AND THIS OBSCURES THE RESPONSE FROM THE LOW LEVEL CLOUD. ALSO THE RELATIVELY POOR RESOLUTION OF THE IR DATA FURTHER OBSCURES THE CHANGE IN CLOUD CHARACTERISTICS (SEE FIGURE 3). THIS MAKES THE IR PICTURES LESS USEFUL IN PLACING RIDGE LINES.

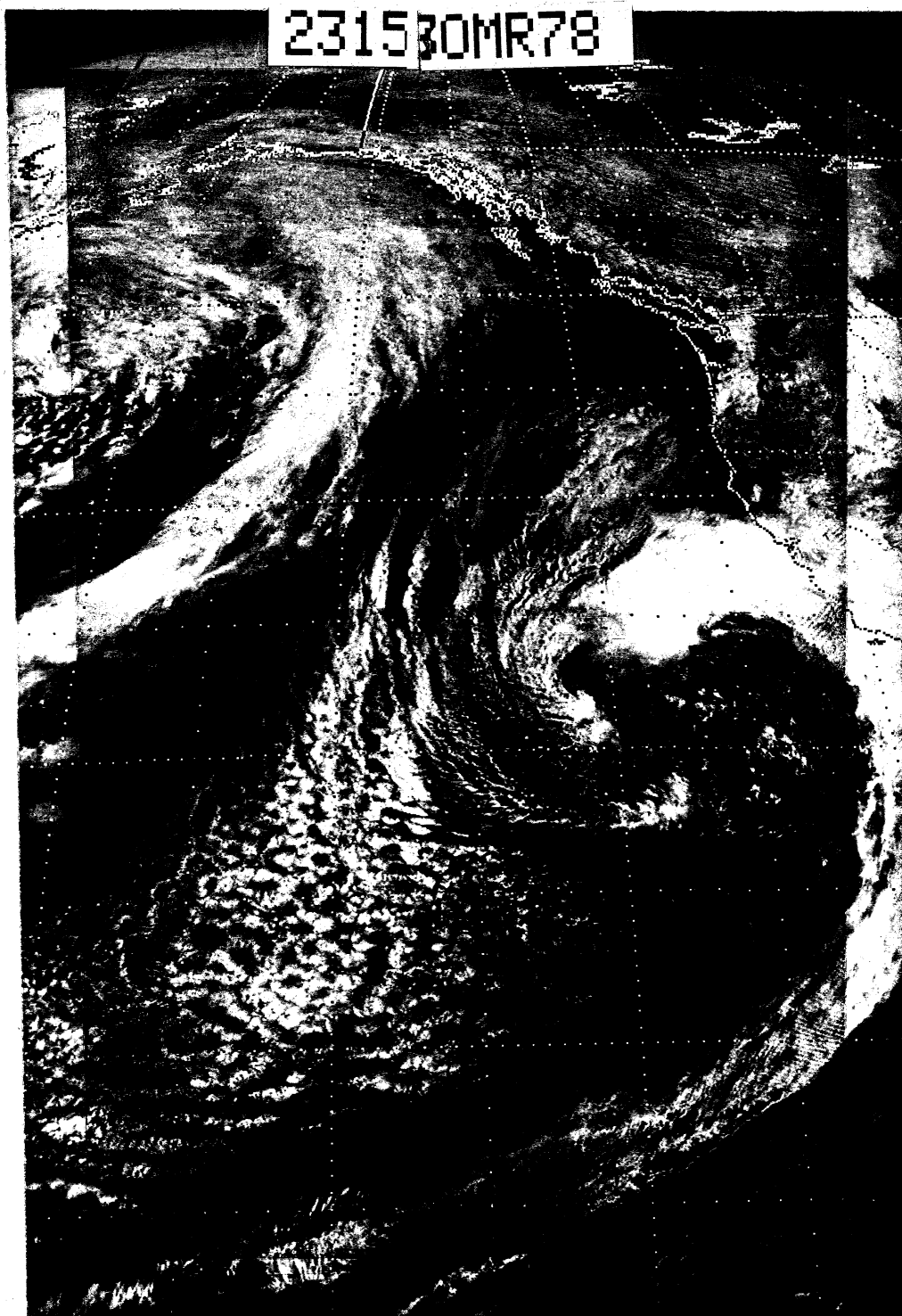


Figure 1. Visual picture taken 2315Z, March 30th, 1978



Figure 3. Infrared satellite picture (ZA enhancement)
valid 1445Z, March 30, 1978