Research Paper No.4

to

Office of Naval Research

Paths of Gridpoint-Crossing Typhoons in 45 Years, 1950-1994

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STORM DATA PROJECT

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Section One

Gridpoint-Specific Computations of Typhoon Characteristics

The central pressure of a typhoon varies with time. Meanwhile, the center of a typhoon travels successively from one location to the next. In determining the variation of the central pressure, for example, it is customary to observe the moving center of a storm on Lagrangian coordinates moving with the storm center.

An observer at a fixed point on the earth is able to determine the central pressure when the storm center is in the proximity of the fixed point. In order to determine the mean central pressure of a number of the typhoons affecting a fixed point, one will have to stay at a fixed poimt year after year until a reasonable number of typhoons pass nearby.

Since such an attempt is humanly impossible, an attempt was made to store 45 years of typhoon data on Lagrangian coordinates and to compute the gridpoint-specific typhoon data by selecting the proximity paths of all typhoons during the 45 years, 1950-1994.

Gridpoint-specific (fixed-point) computations were made by selecting 147 gridpoints. Computed were (1) the number of typhoon centers which moved through the 1°x 1° or 111 km x 111 km square centered at each gridpoint, (2) mean central pressure of the typhoons during the time of their proximity and (3) the minimum central pressure at the proximity time of all typhoons involved.

Shown in the following figures are the gridpoint values and their contour maps which can be used to determine the locations of (1) most frequent typhoons, (2) expected mean central pressure, and (3) the lowest record central pressure expected to occur on Eulerian coordinates on the earth.

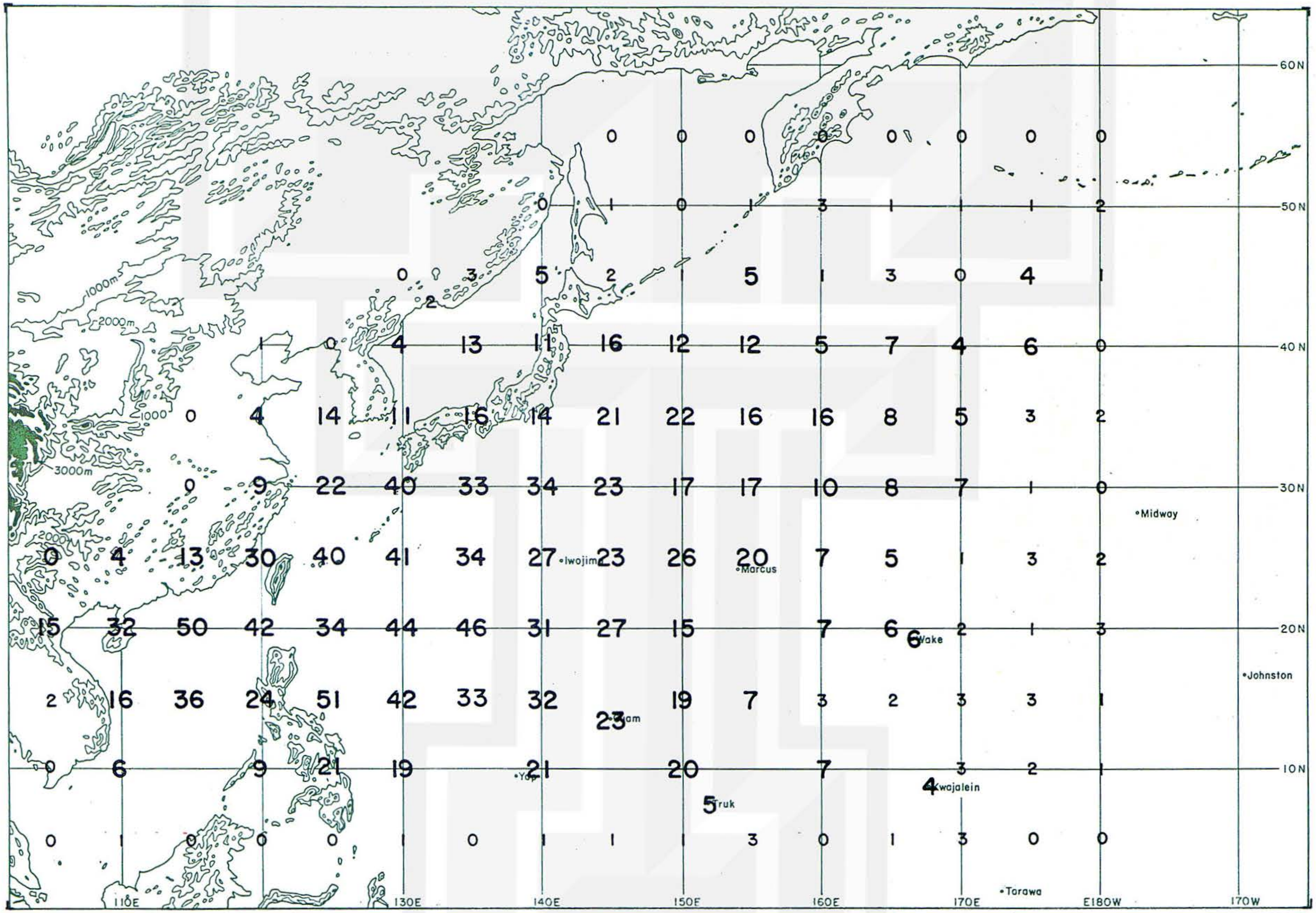

Fig. 1 Number of typhoons which crossed the 147 gridpoints in the Western Pacific area during the 45-year period, 1950-1994. A gridpoint is defined as the 1°x 1° (111 x 111 km) square centered at the geometric point.

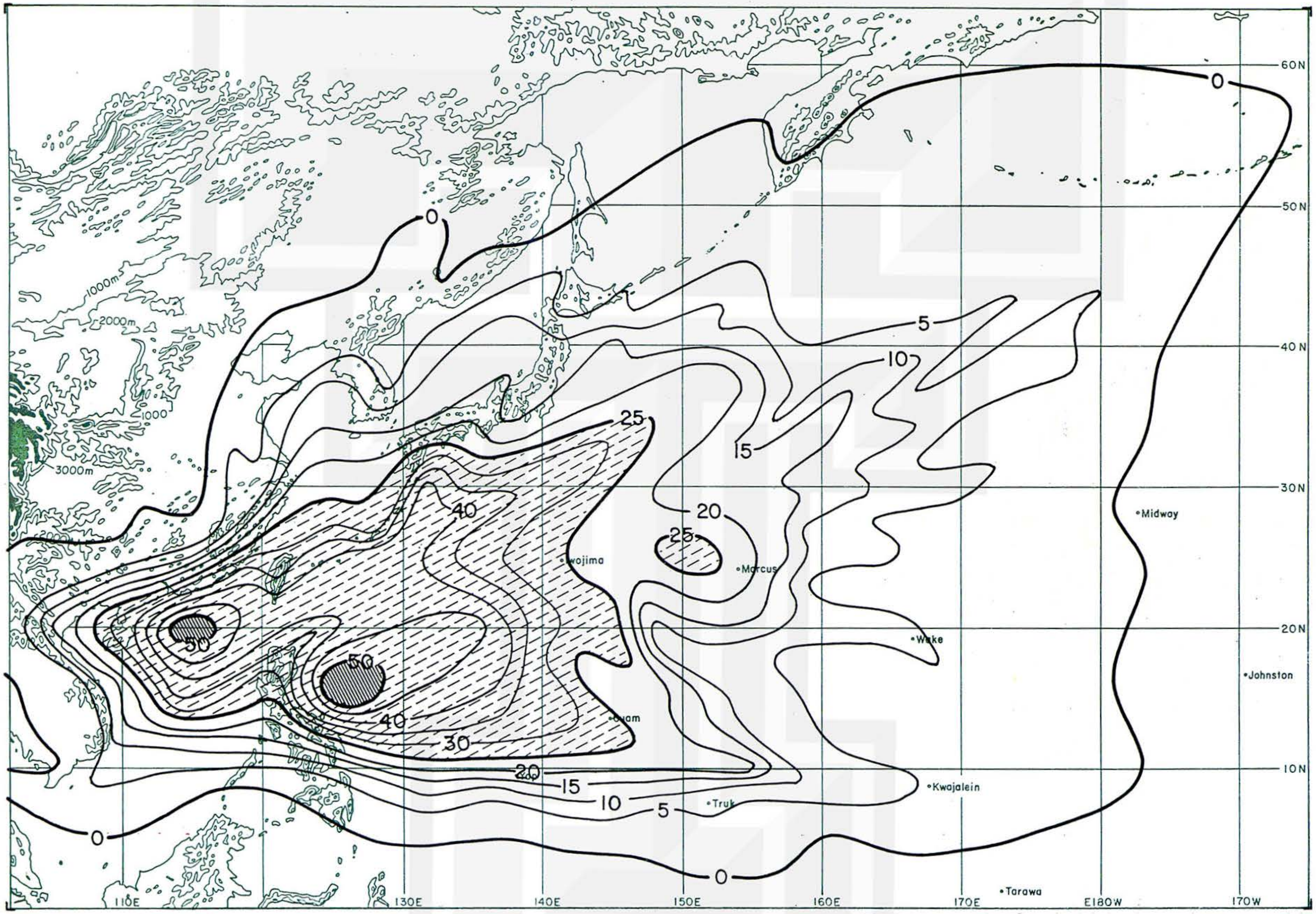

Fig. 2 Contour lines of the numbers shown in Figure 1. Two locations of numbers over 50 are seen in the northern South China Sea and in the Pacific off the east coast of the Philippines.

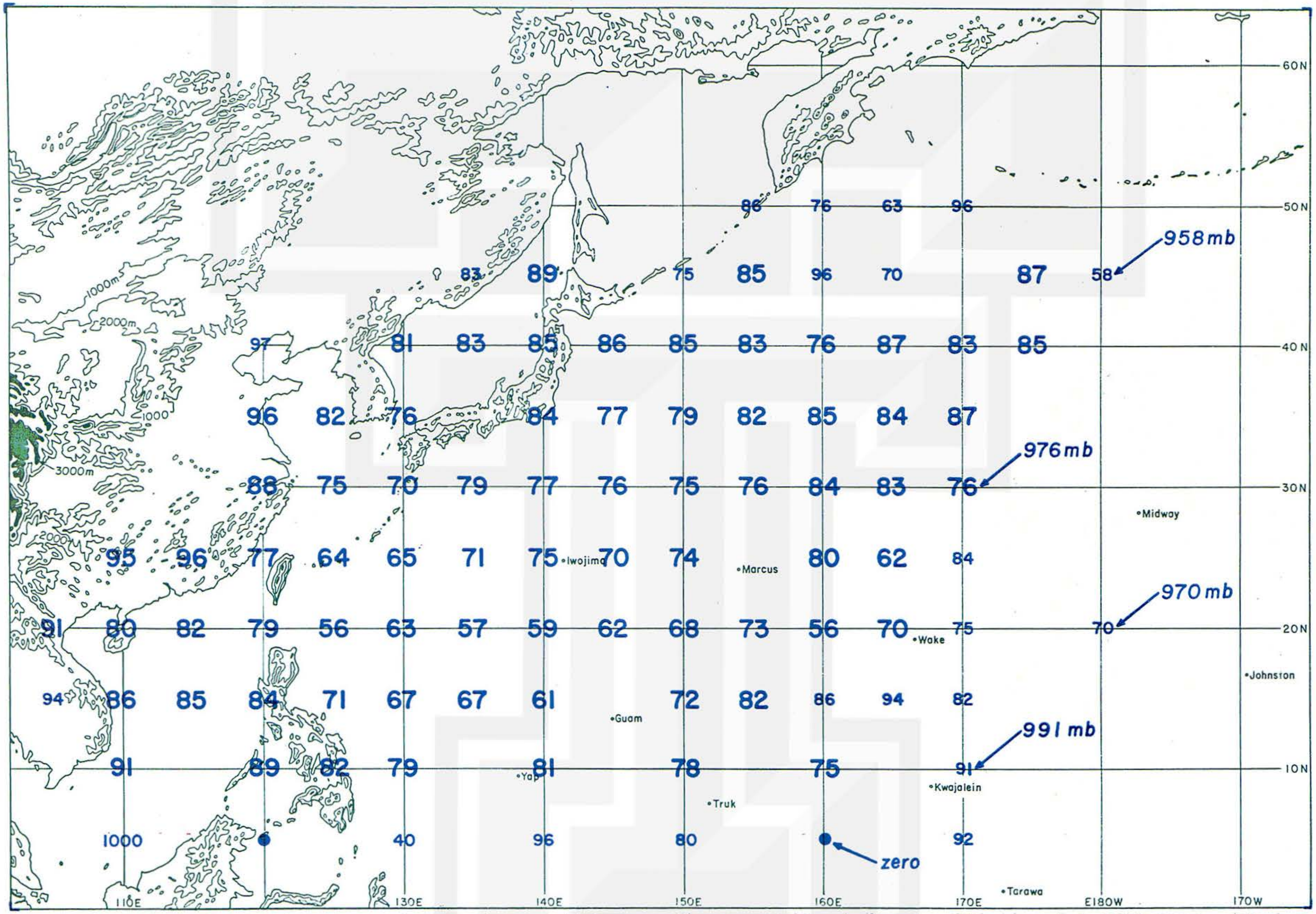

Fig. 3 Mean central pressure of the typhoons which crossed each gridpoint during the 45-year period, 1950-1994. Plotted numbers denote the mean pressure in mb less 900 mb.

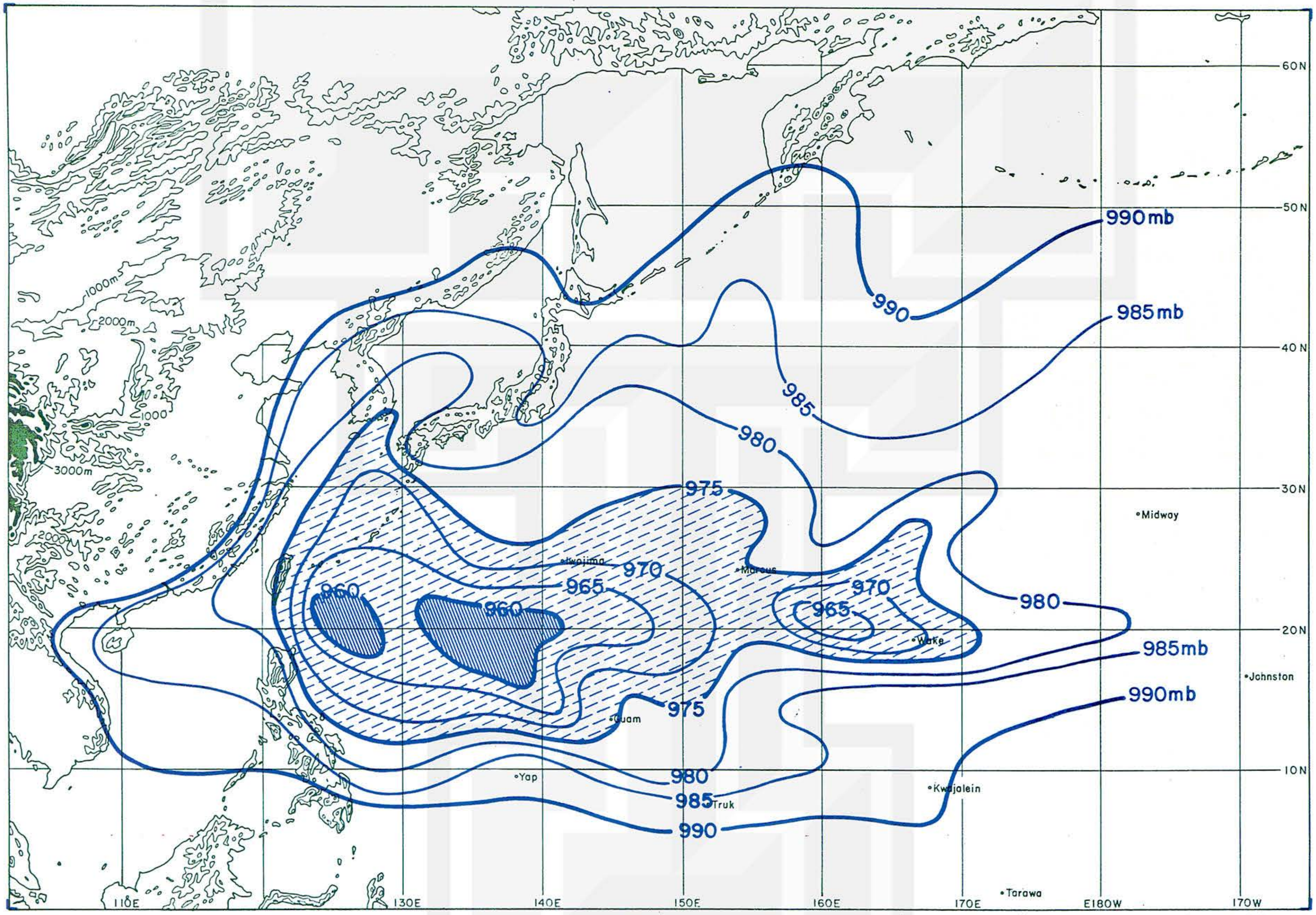

Fig. 4 Mean pressures in Figure 3 contoured for every 5 millibars between 960 and 990 mbs. The lowest mean pressure, 956 mb occurred at 20°N, 125°E off the coast of Luzon Island.

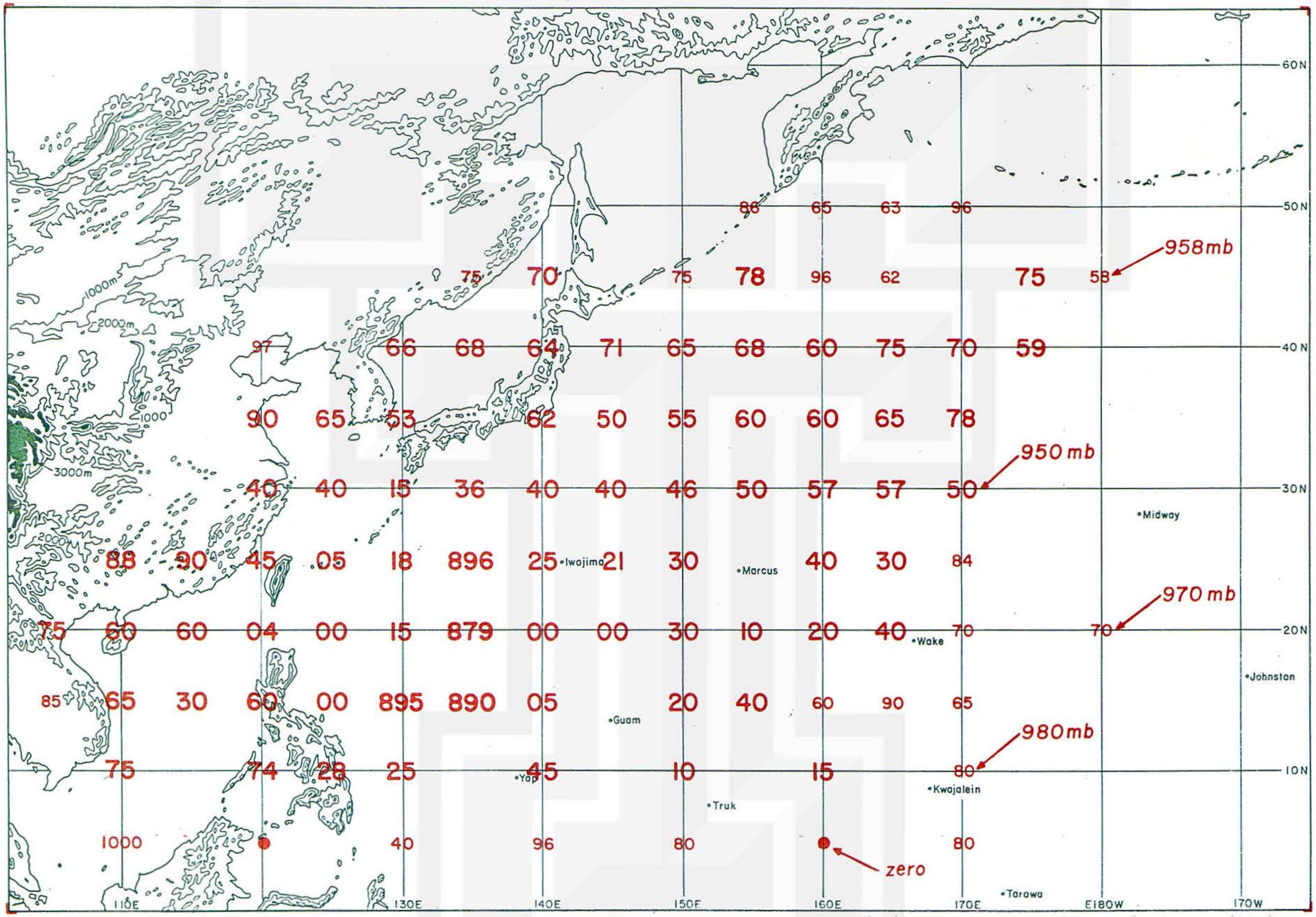

Fig. 5 Minimum central pressure of the typhoons which crossed each gridpoint during the 45-year period, 1950-1994. The lowest minimum pressure, 879 mb occurred at 20°N, 135°E.

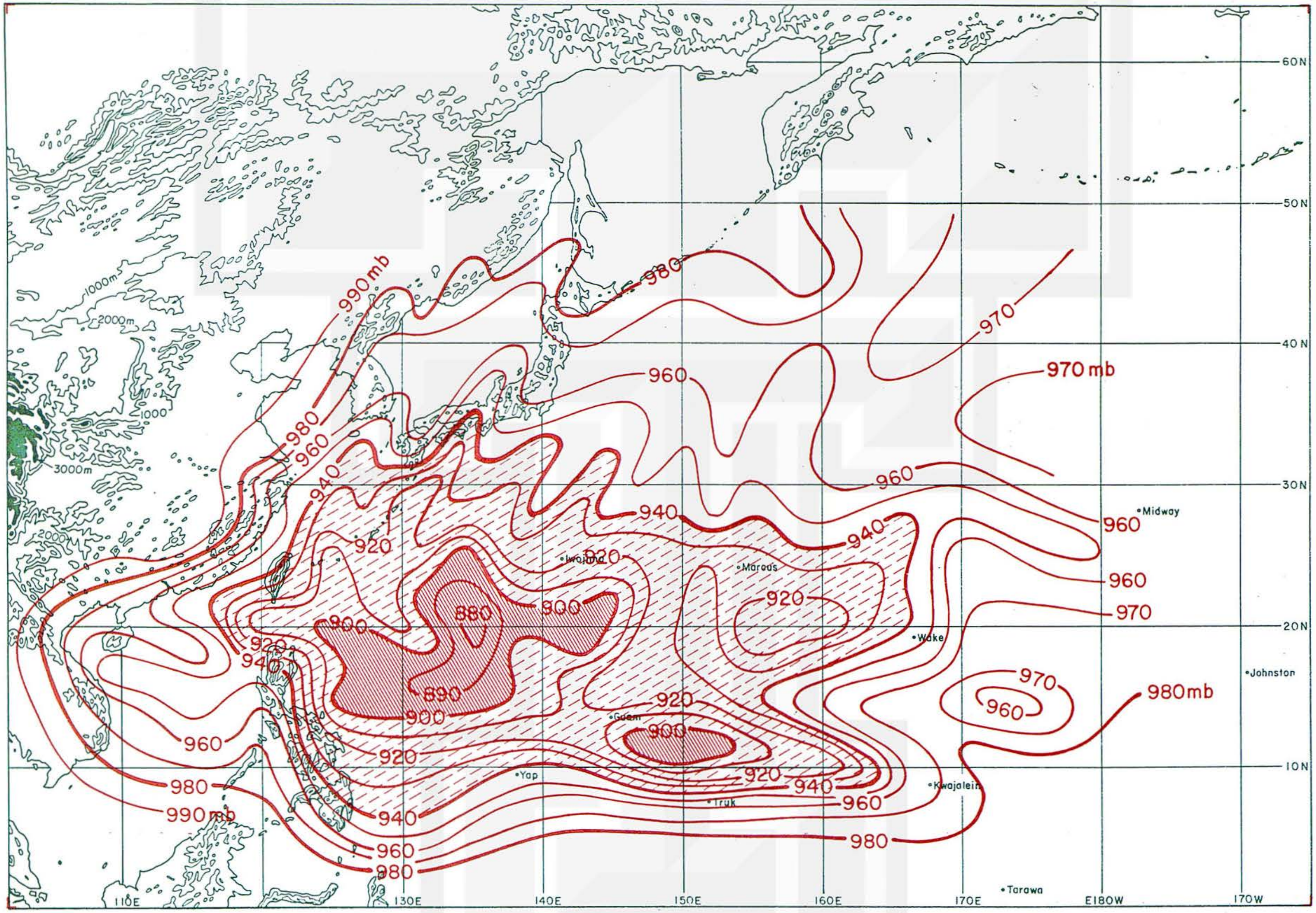

Fig. 6 Contour lines of the gridpoint-specific minimum central pressure shown in Figure 7. Contour intervals are 10 mb.

Section Two

Paths of Typhoons Which Crossed 46 Selected Gridpoints During the 45-Year Period, 1950-1994

Presented in each of the following 46 maps are the paths of all typhoons that crossed a selected gridpoint (indicated by a yellow dot) during the 45-year period, 1950-1994. Colored segments of the paths denote a specific range of central pressure as follows:

Red:	$P_c \leq 920$ mb
Blue:	920 mb $< P_c \leq 950$ mb
Green:	950 mb $< P_c$

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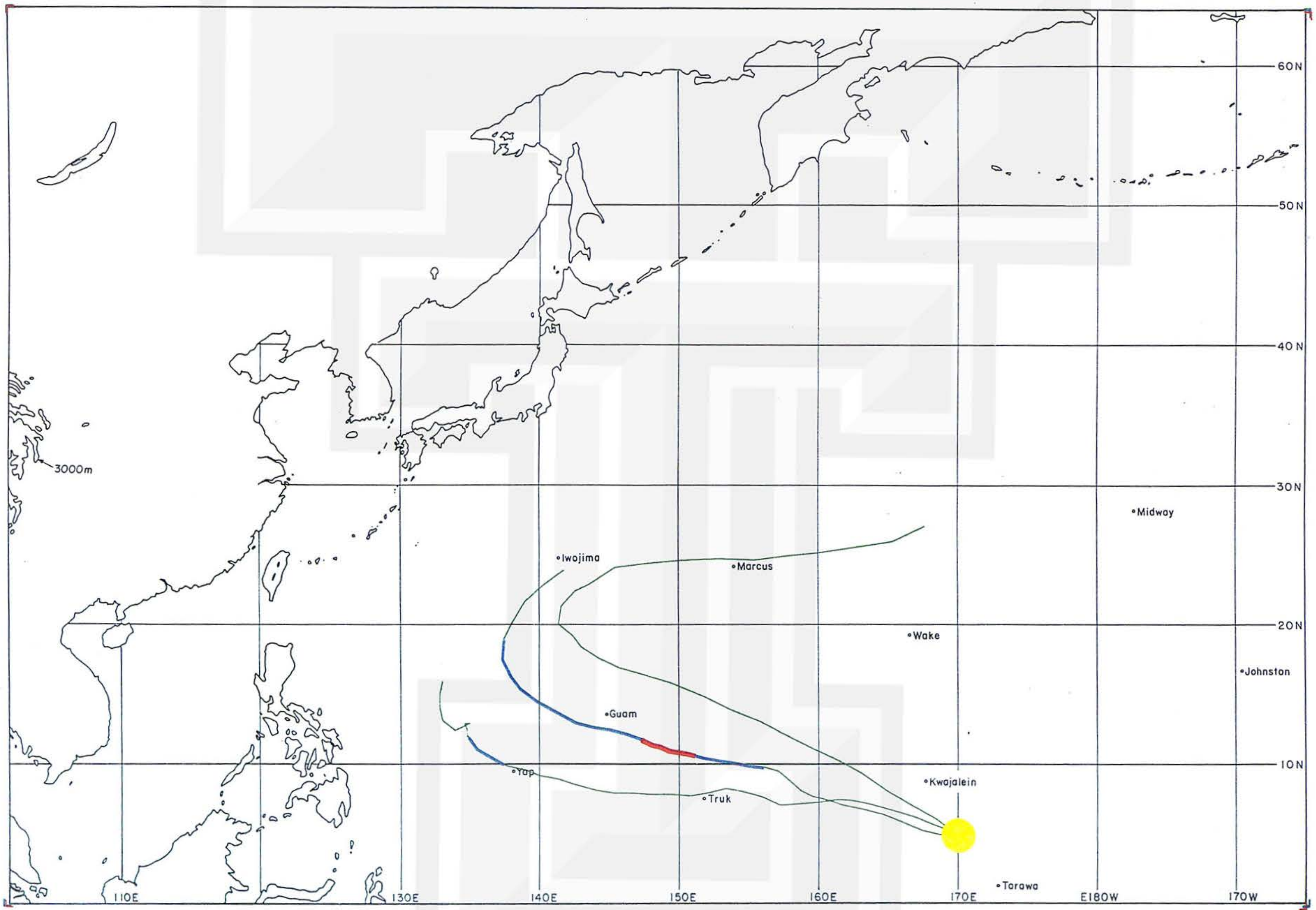
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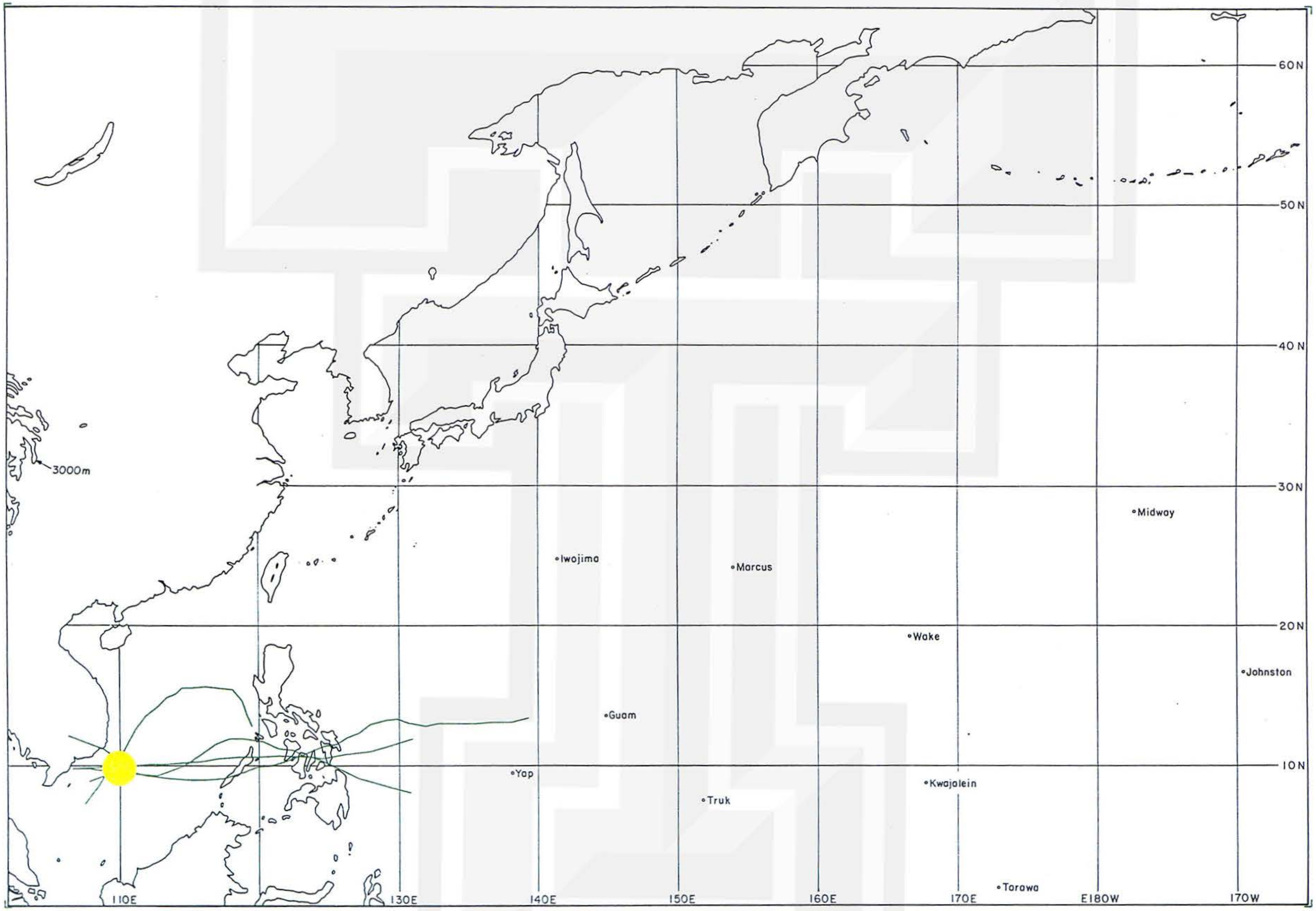
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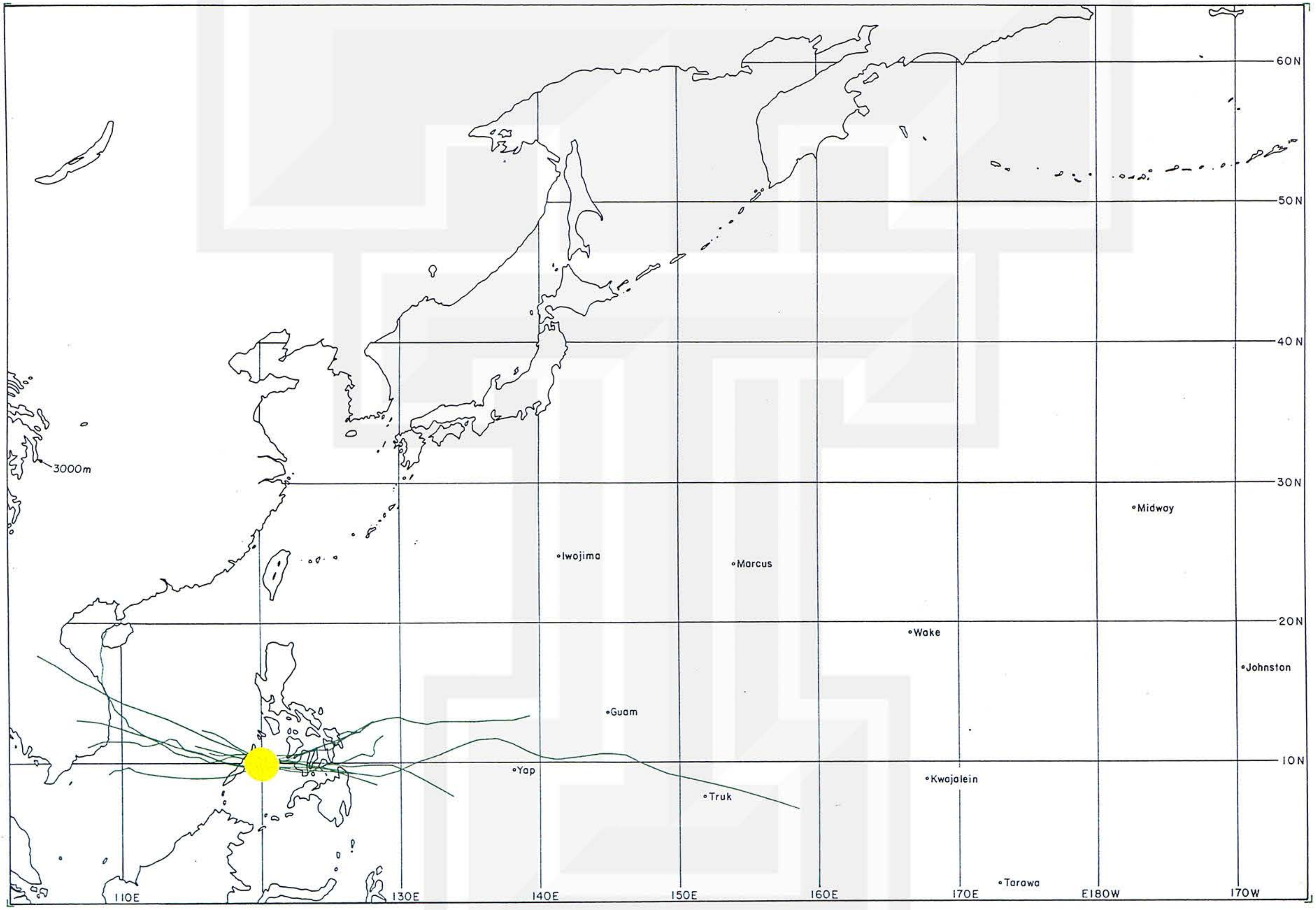

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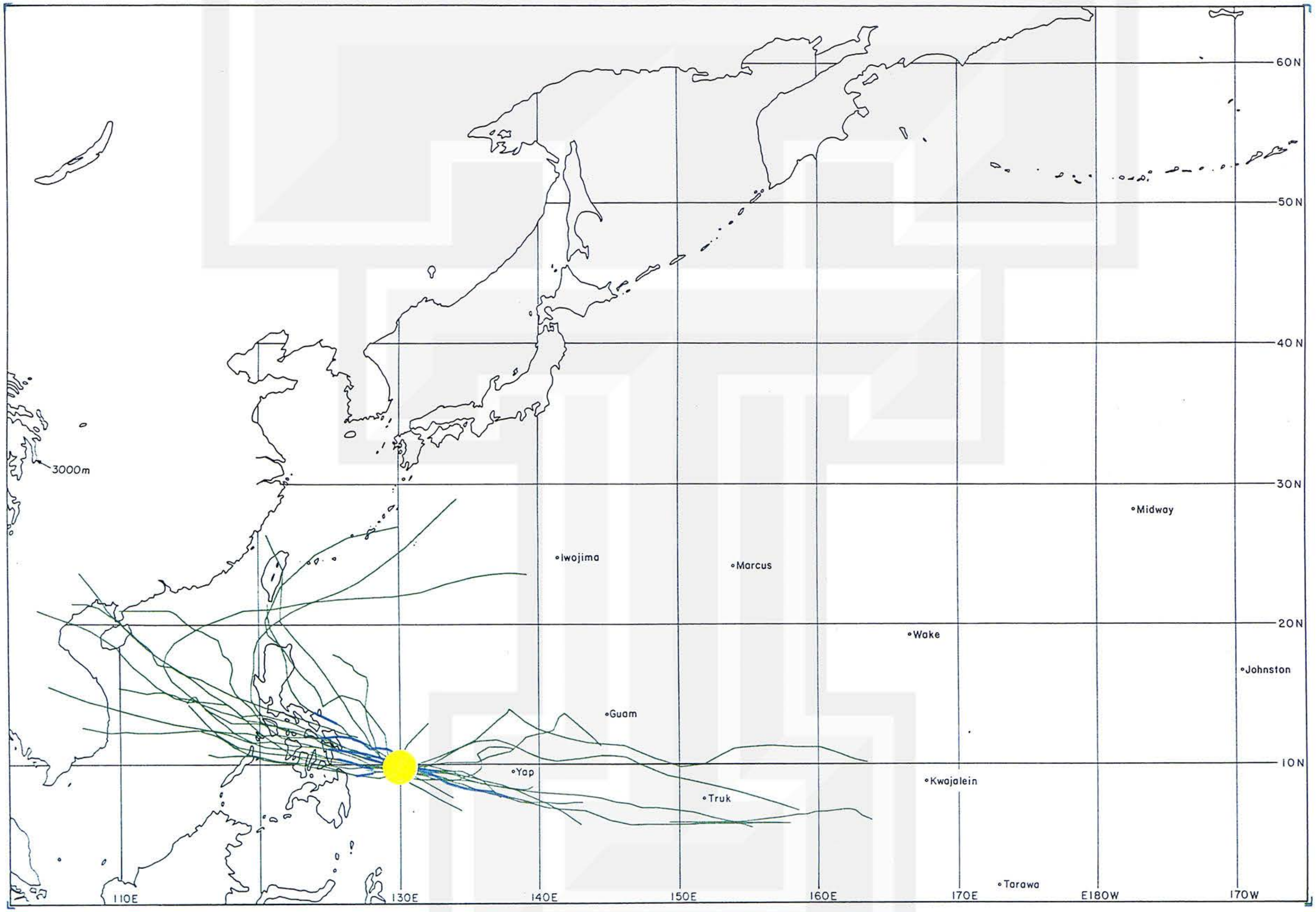
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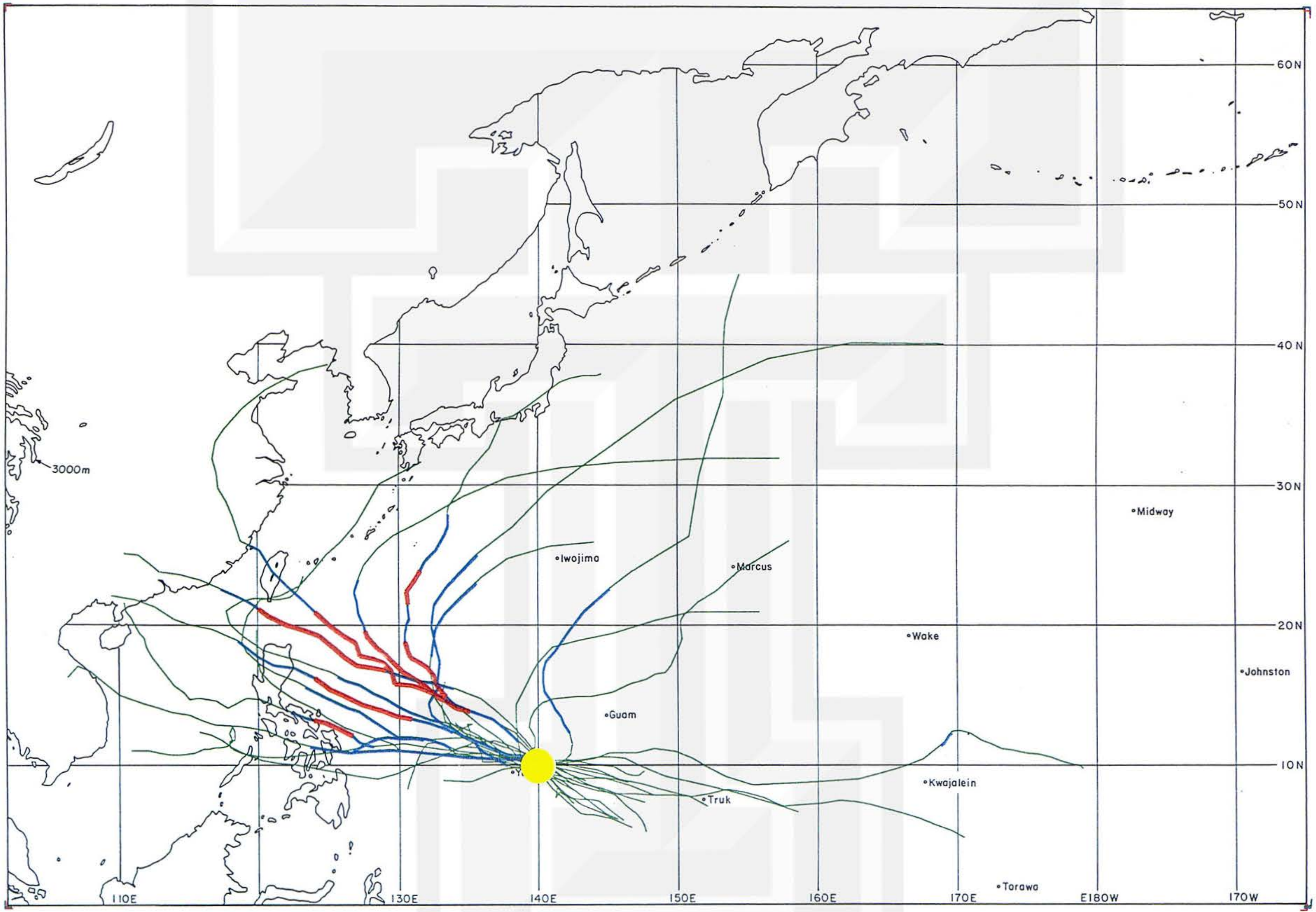

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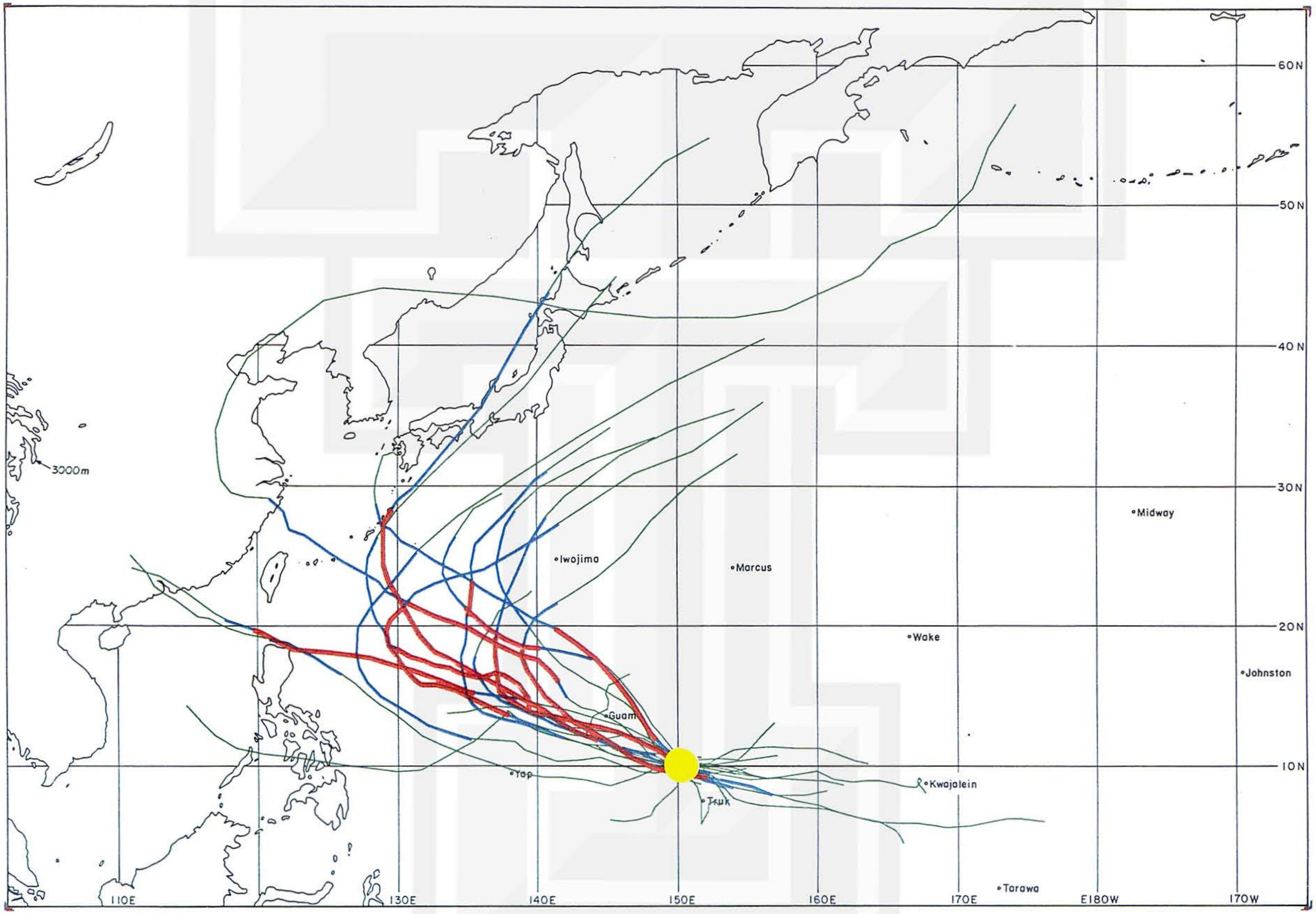
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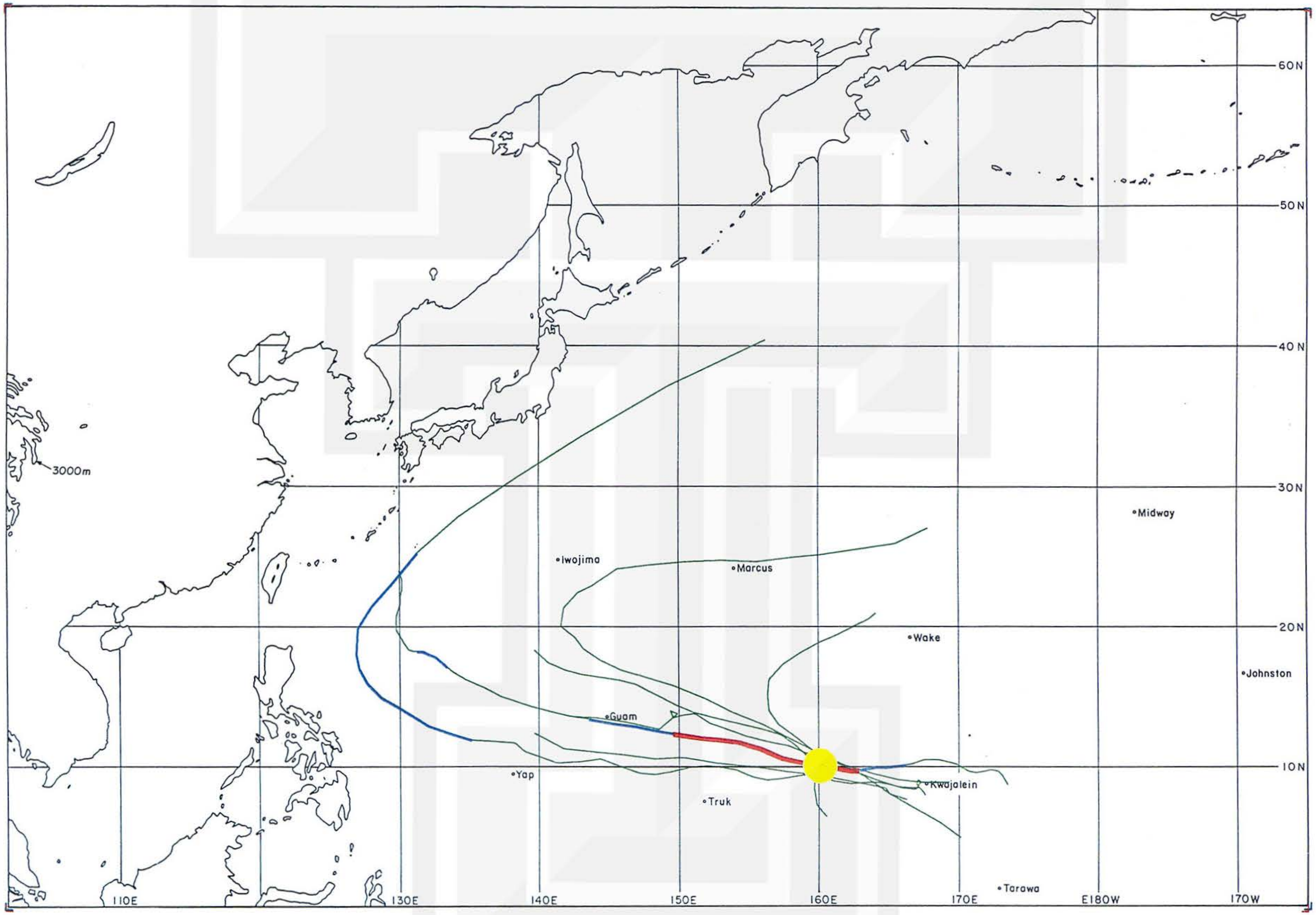

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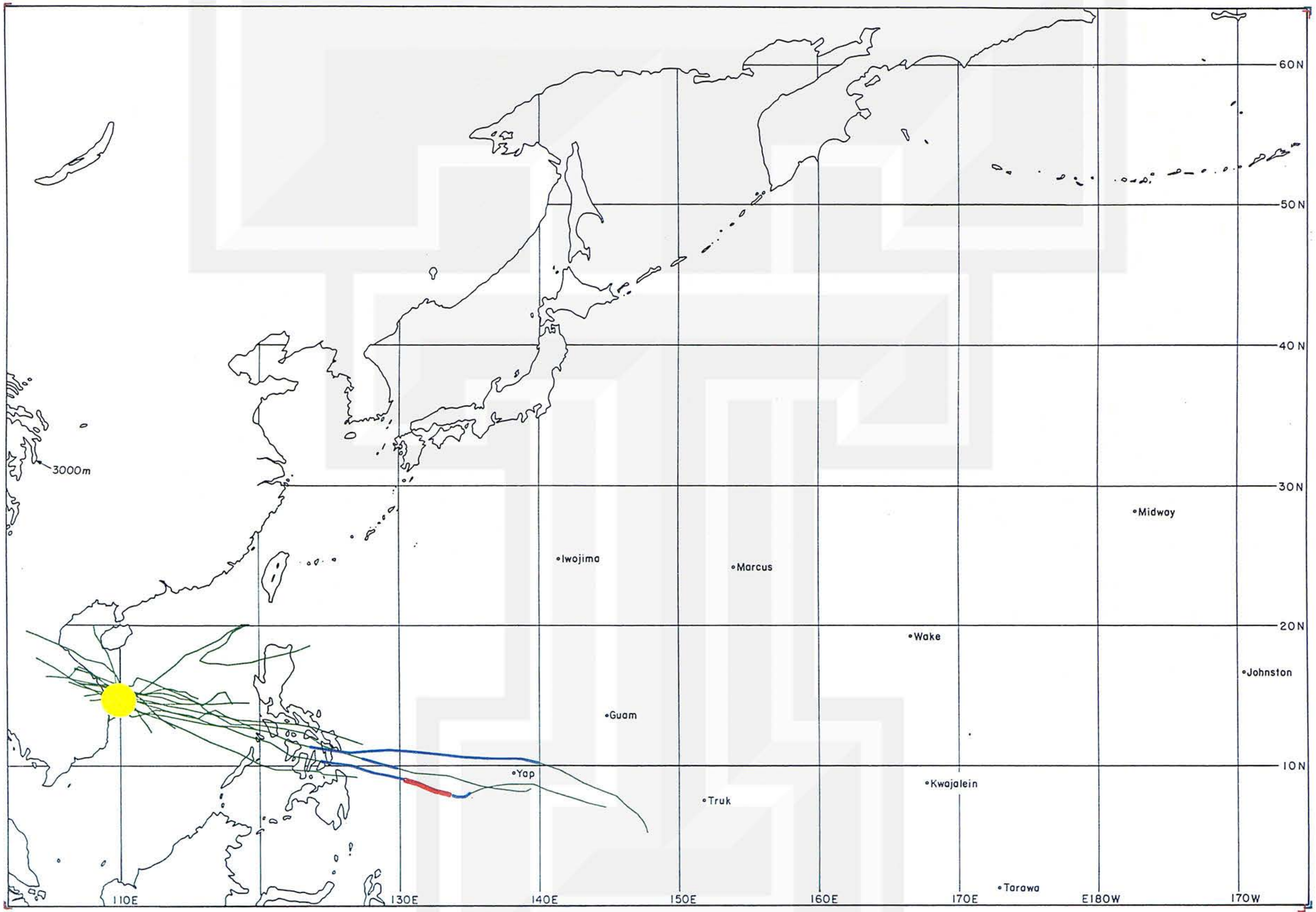
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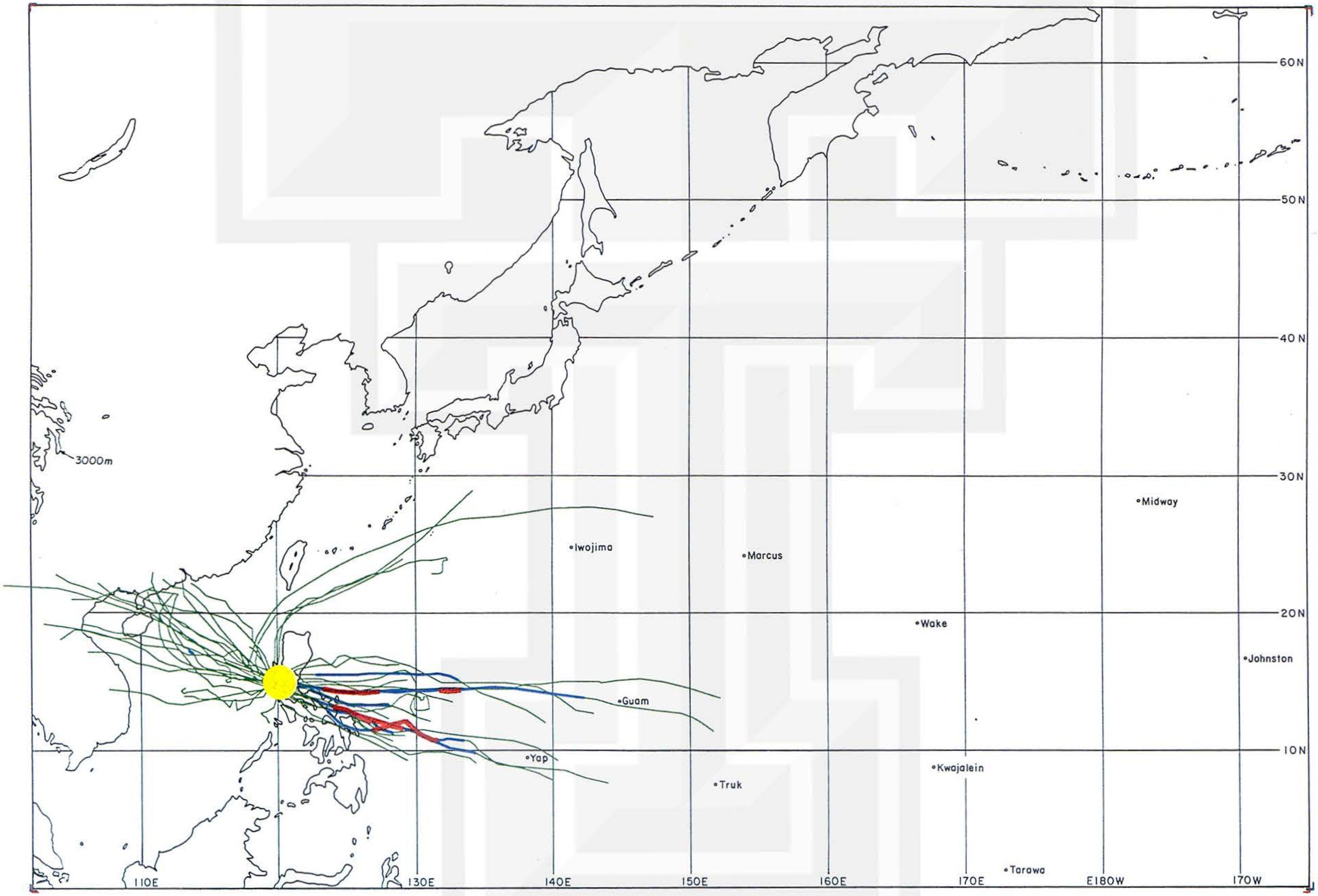

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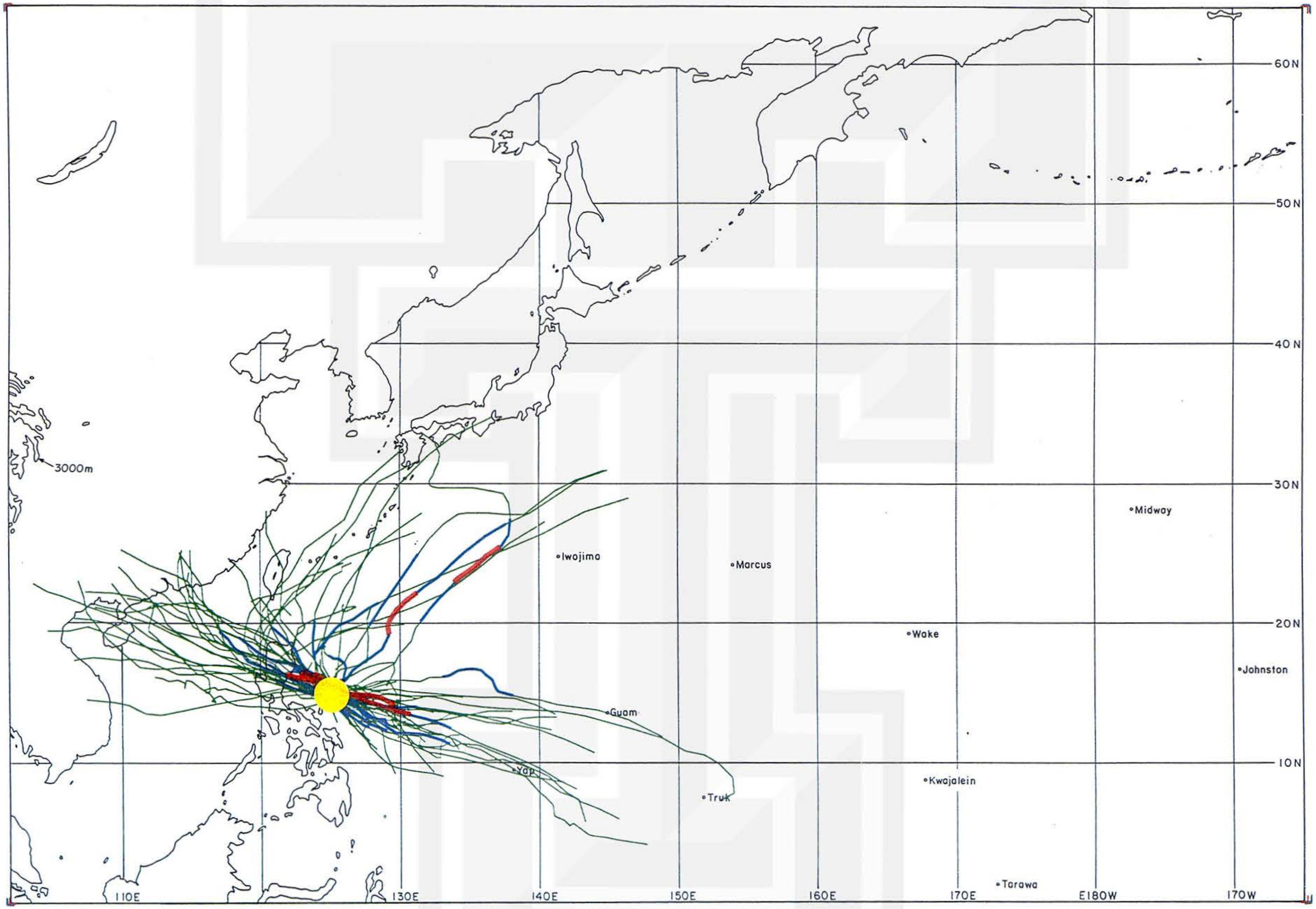

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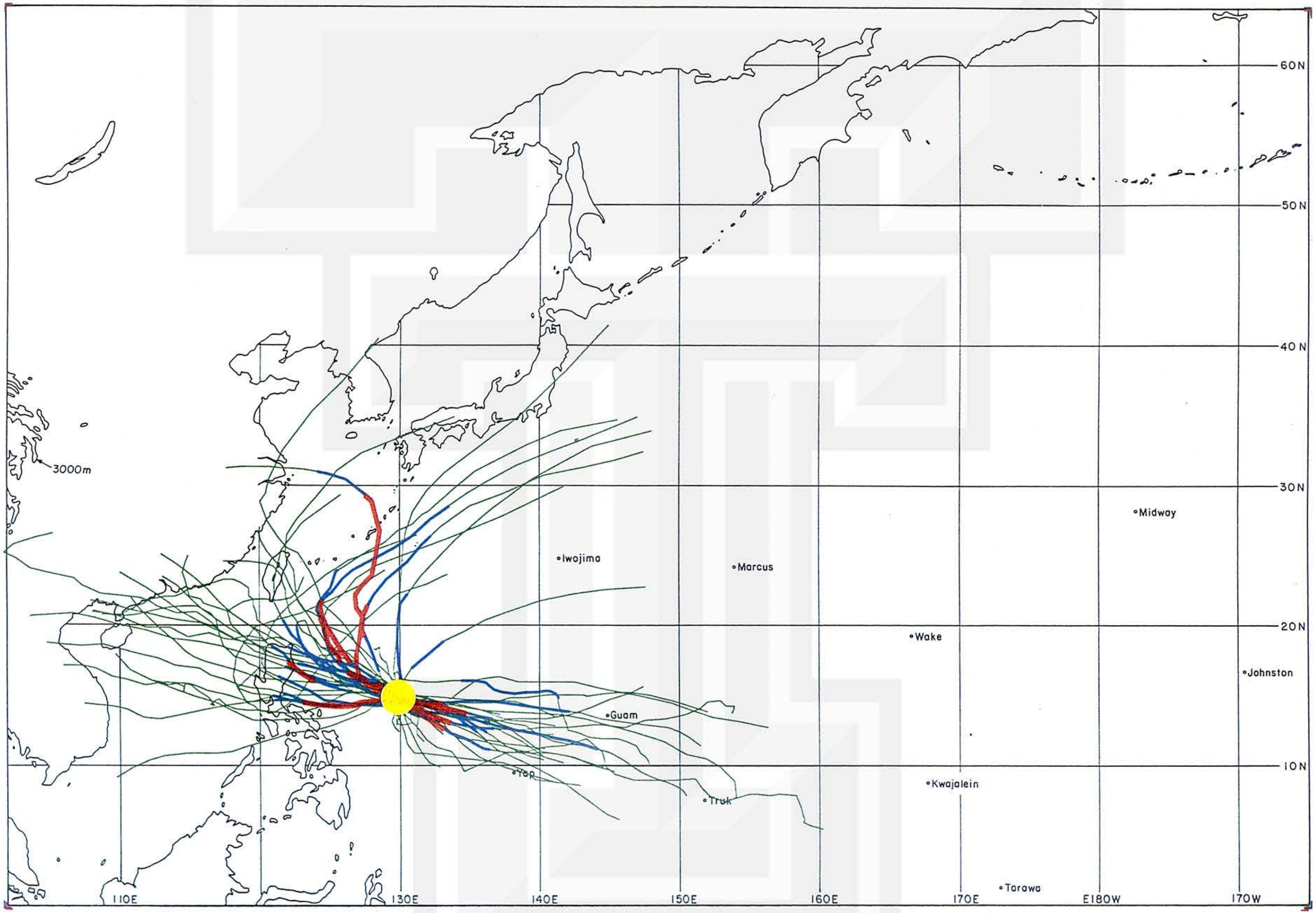

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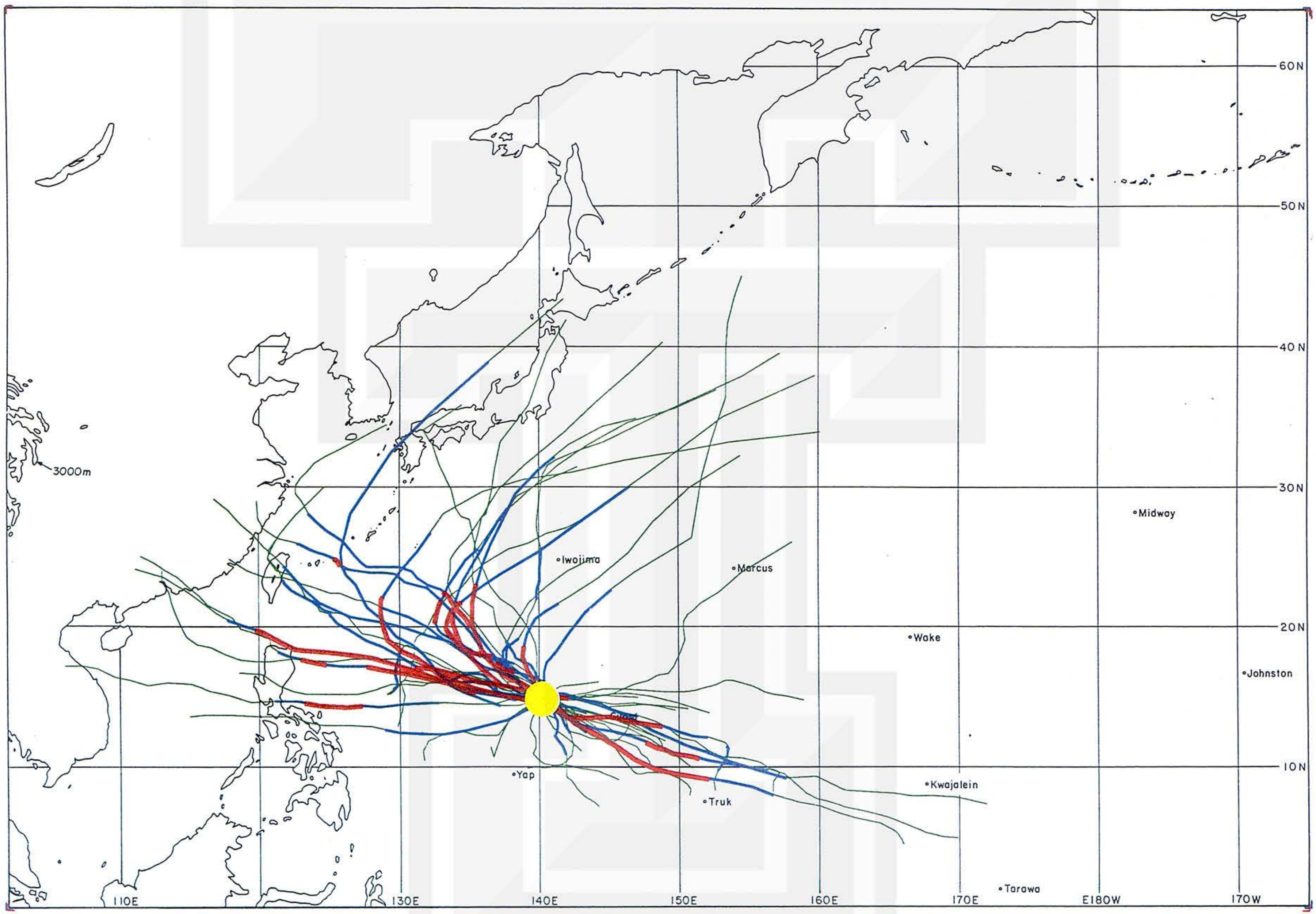
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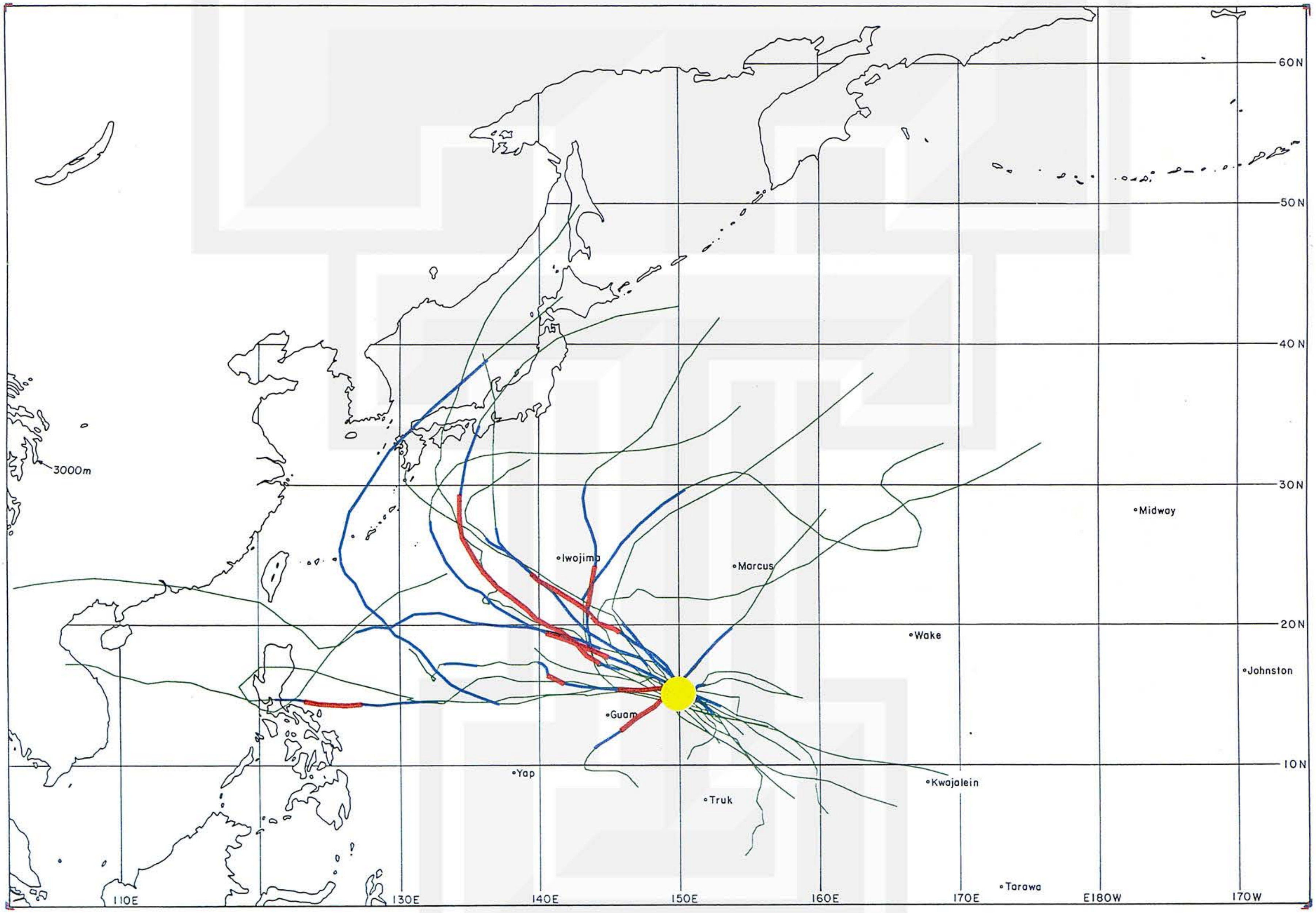

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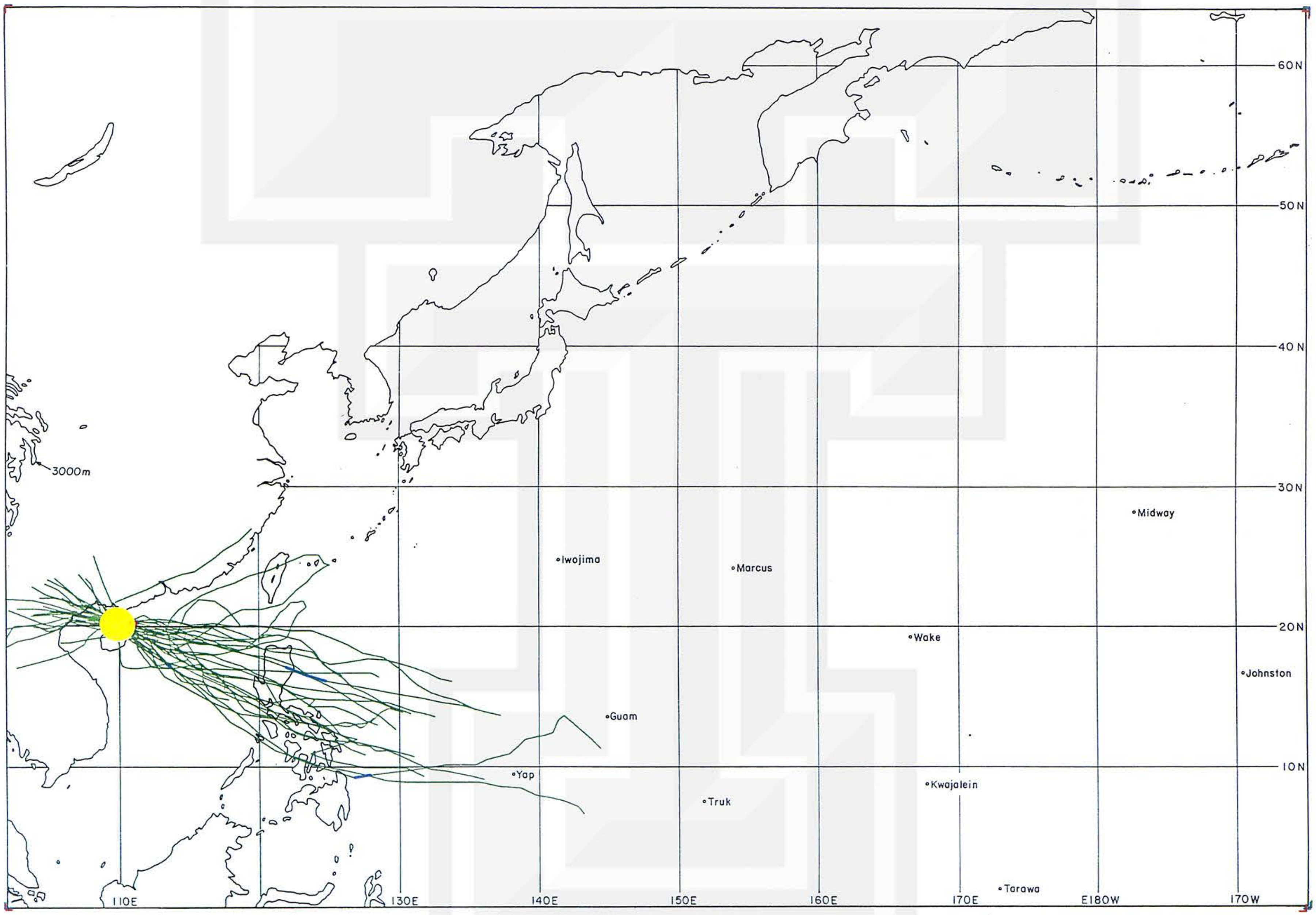
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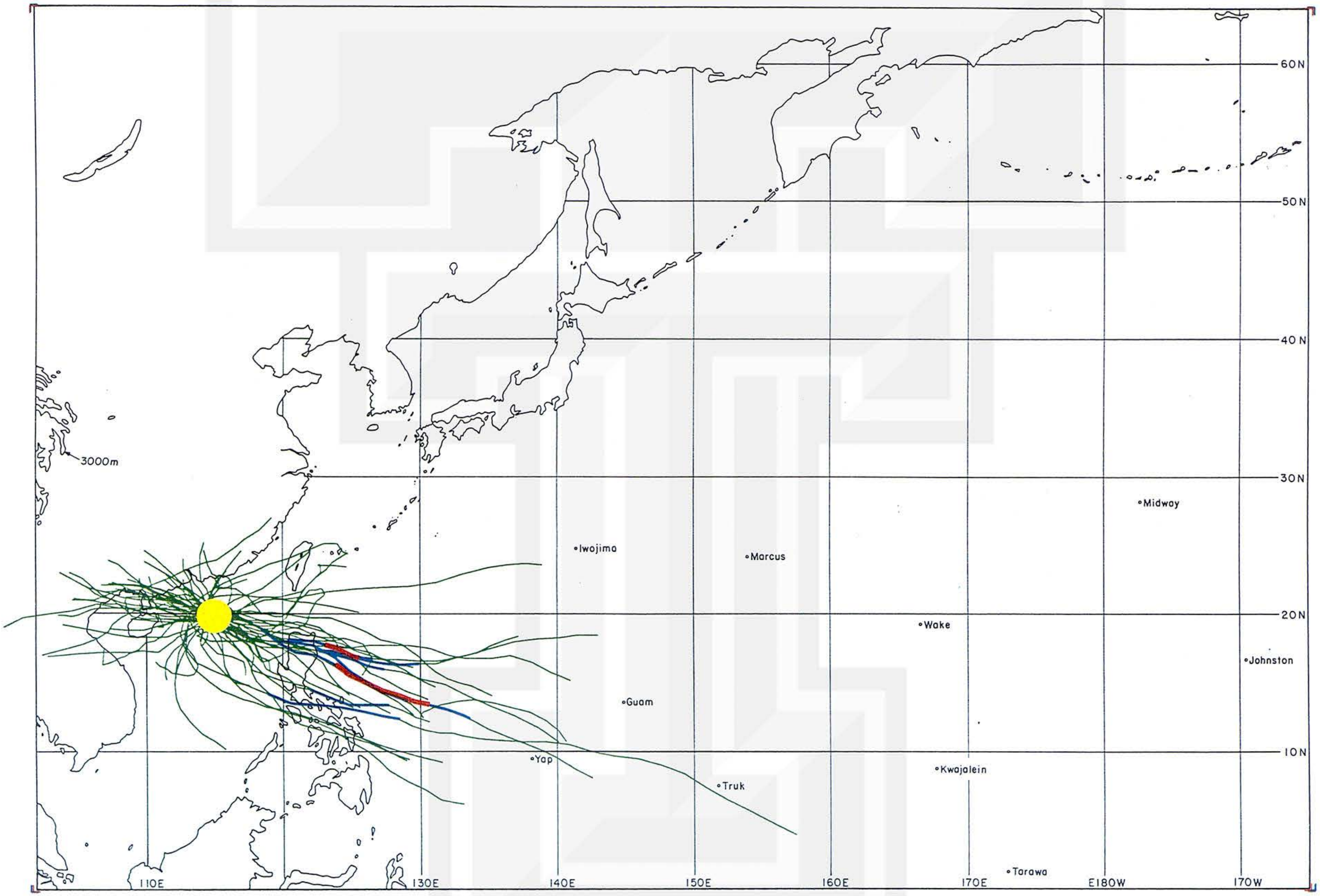
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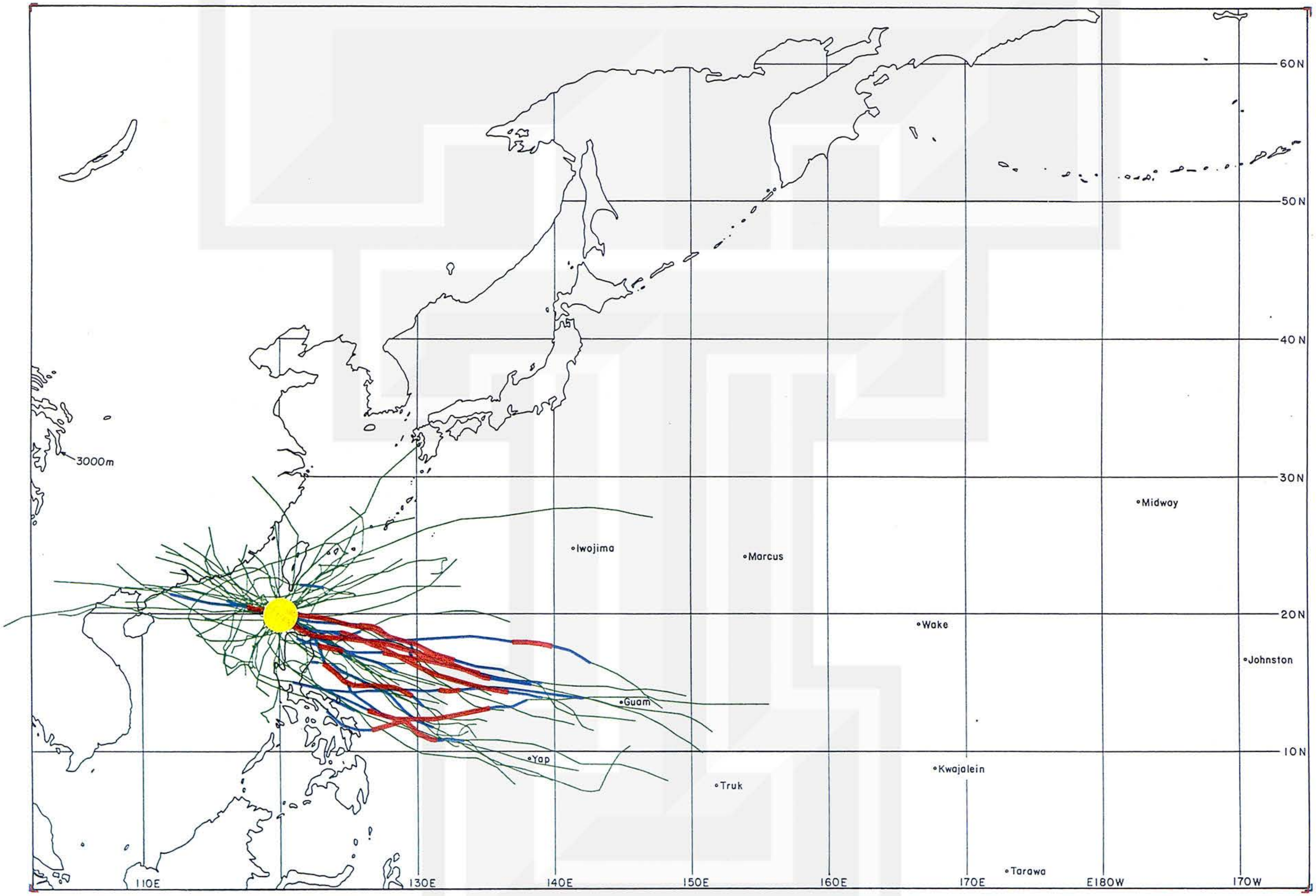

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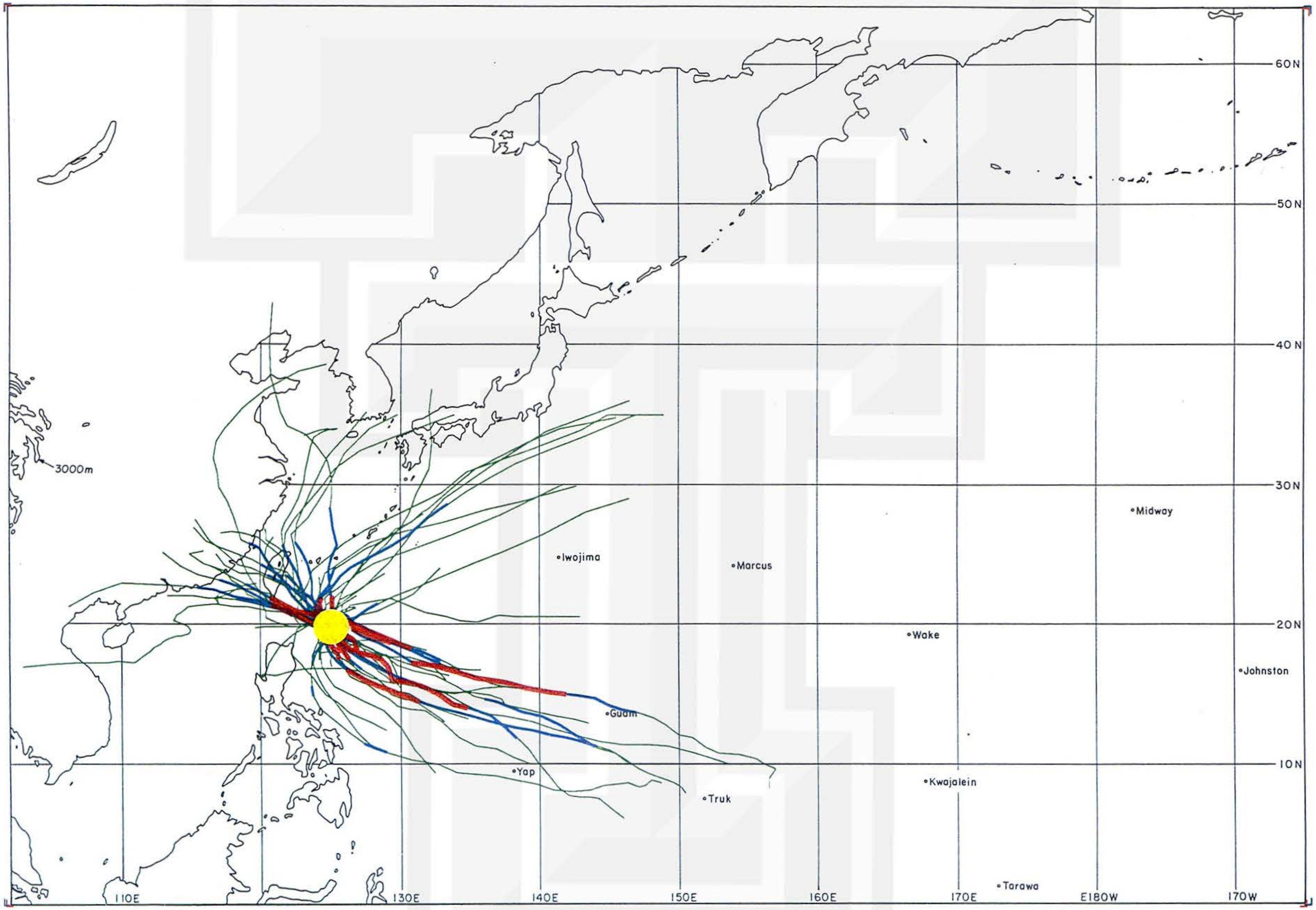
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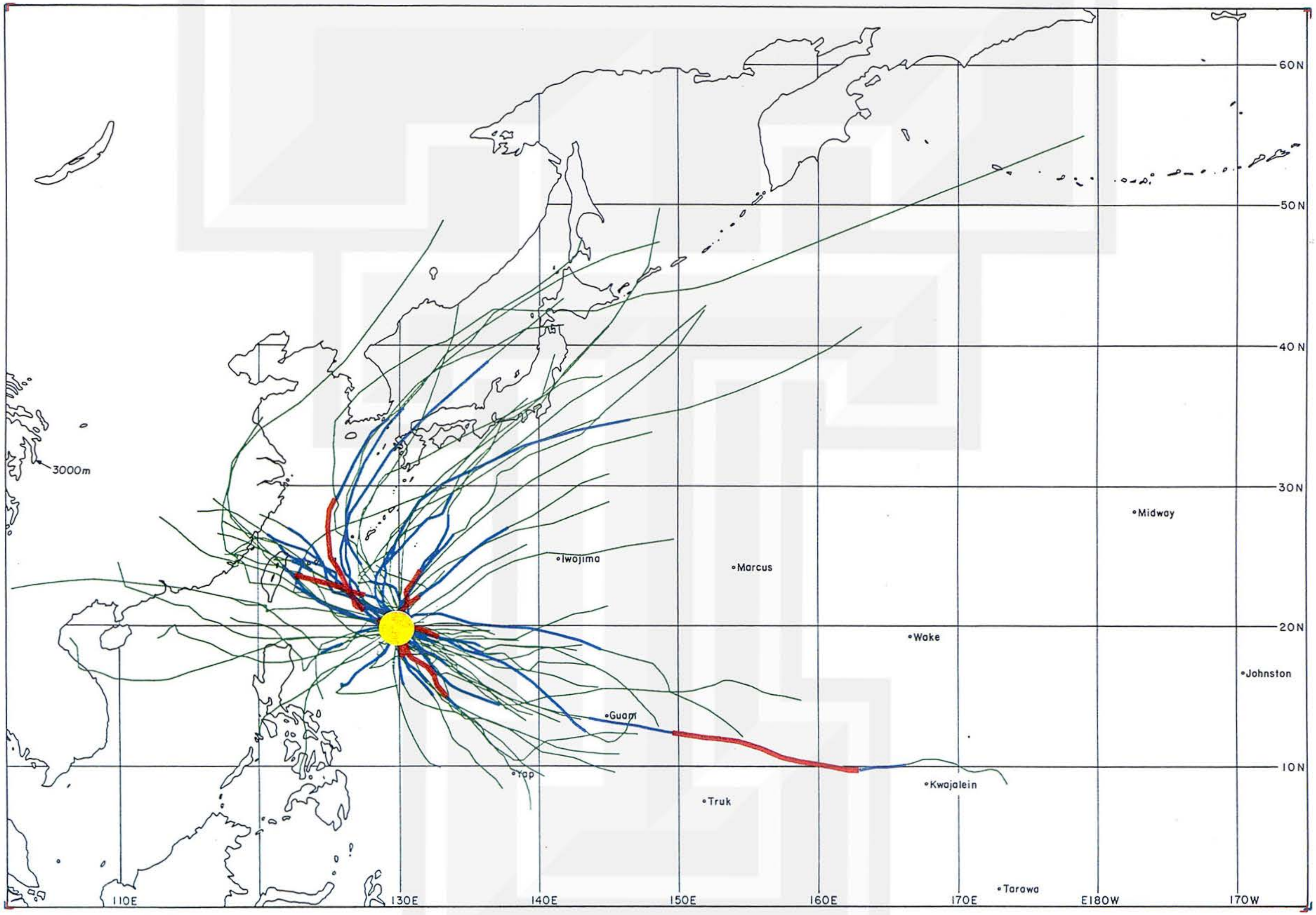

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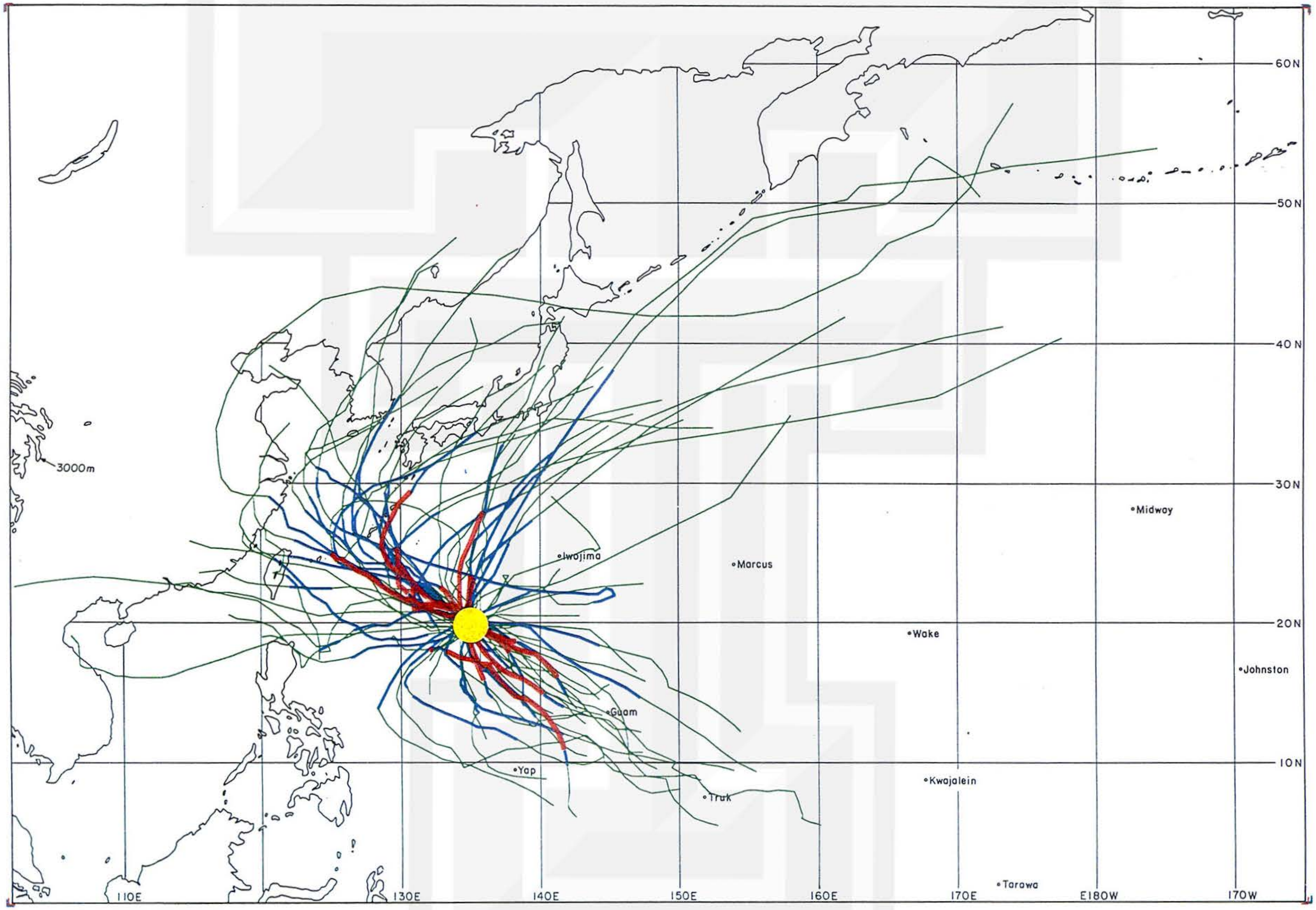

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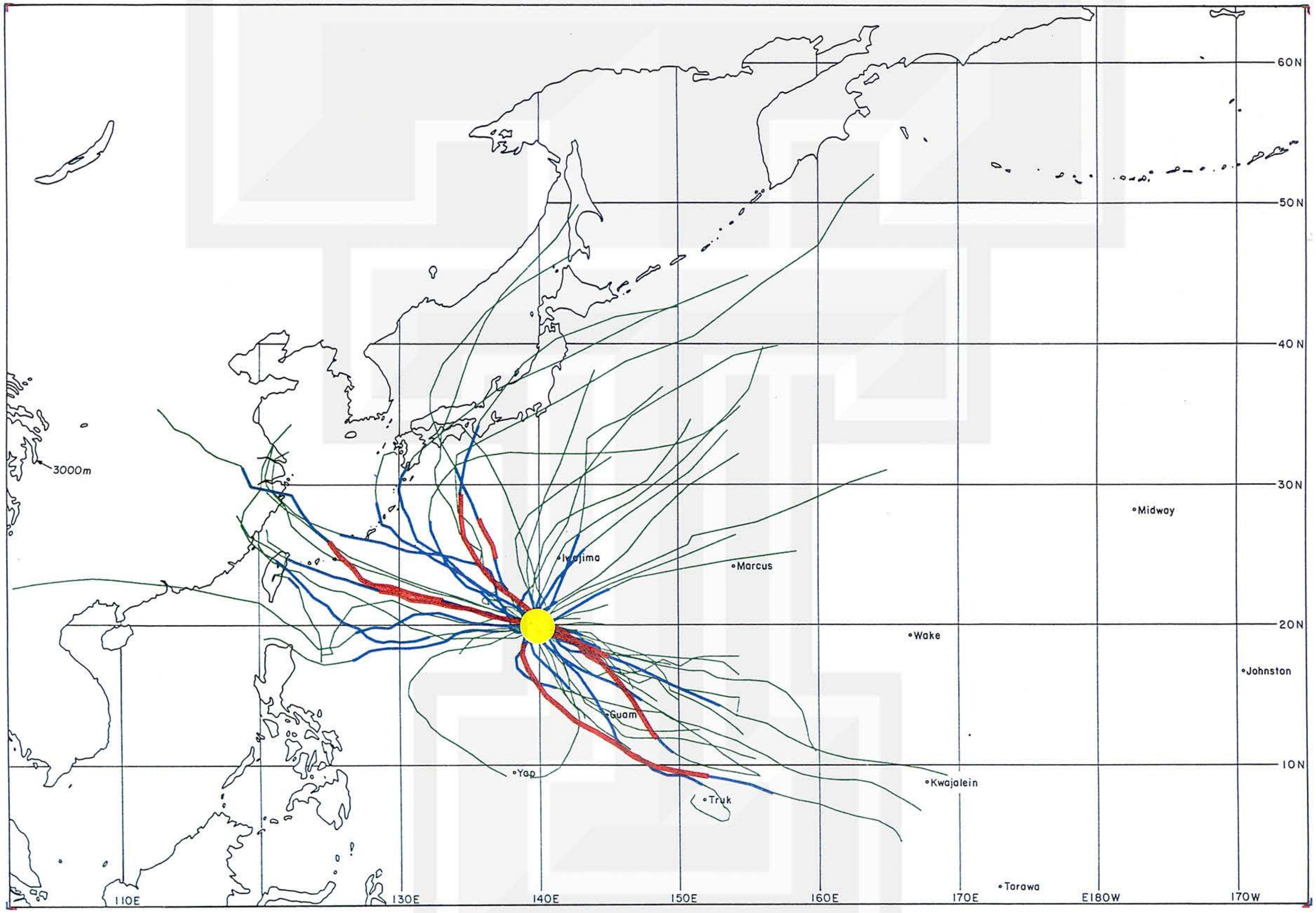
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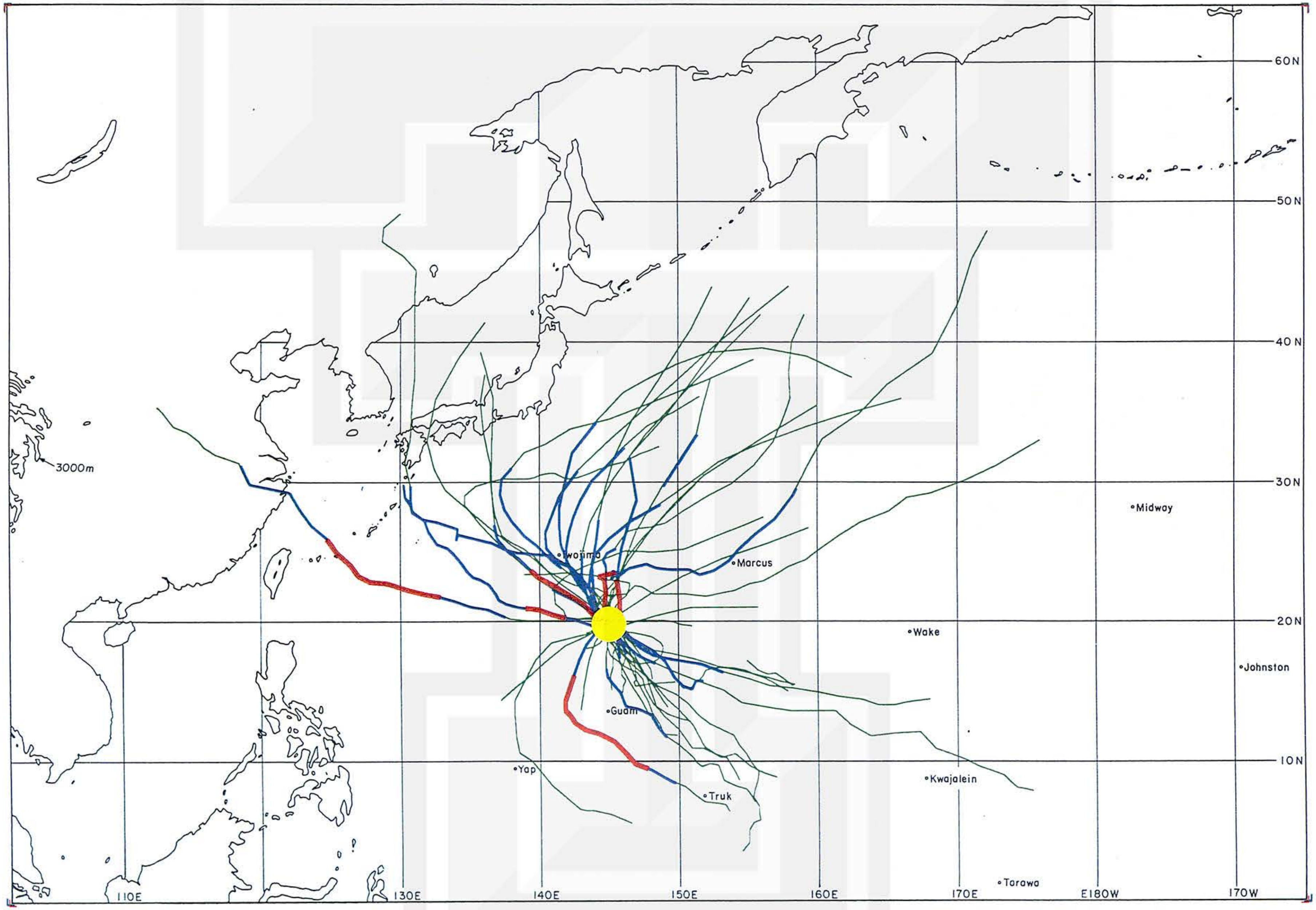
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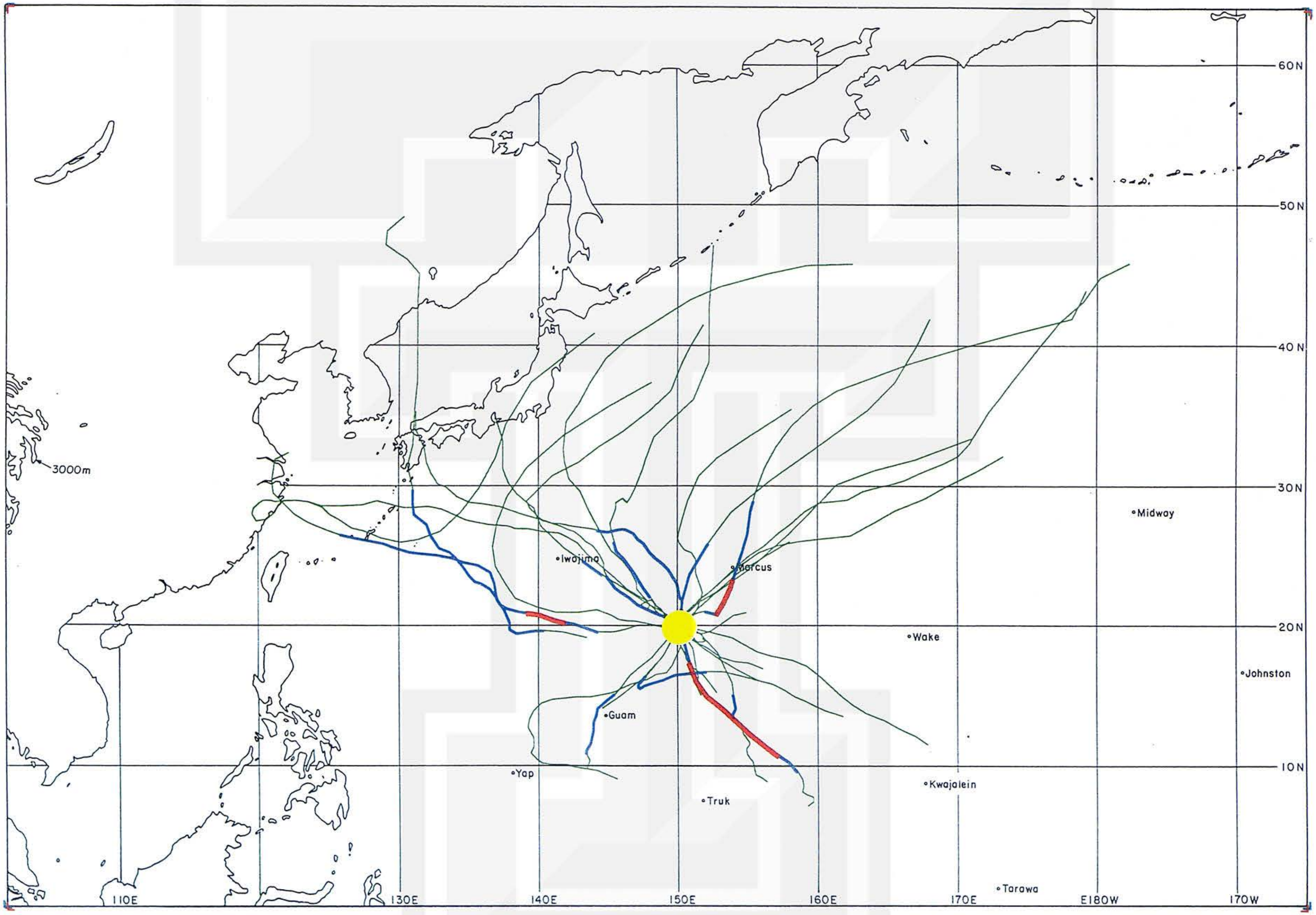
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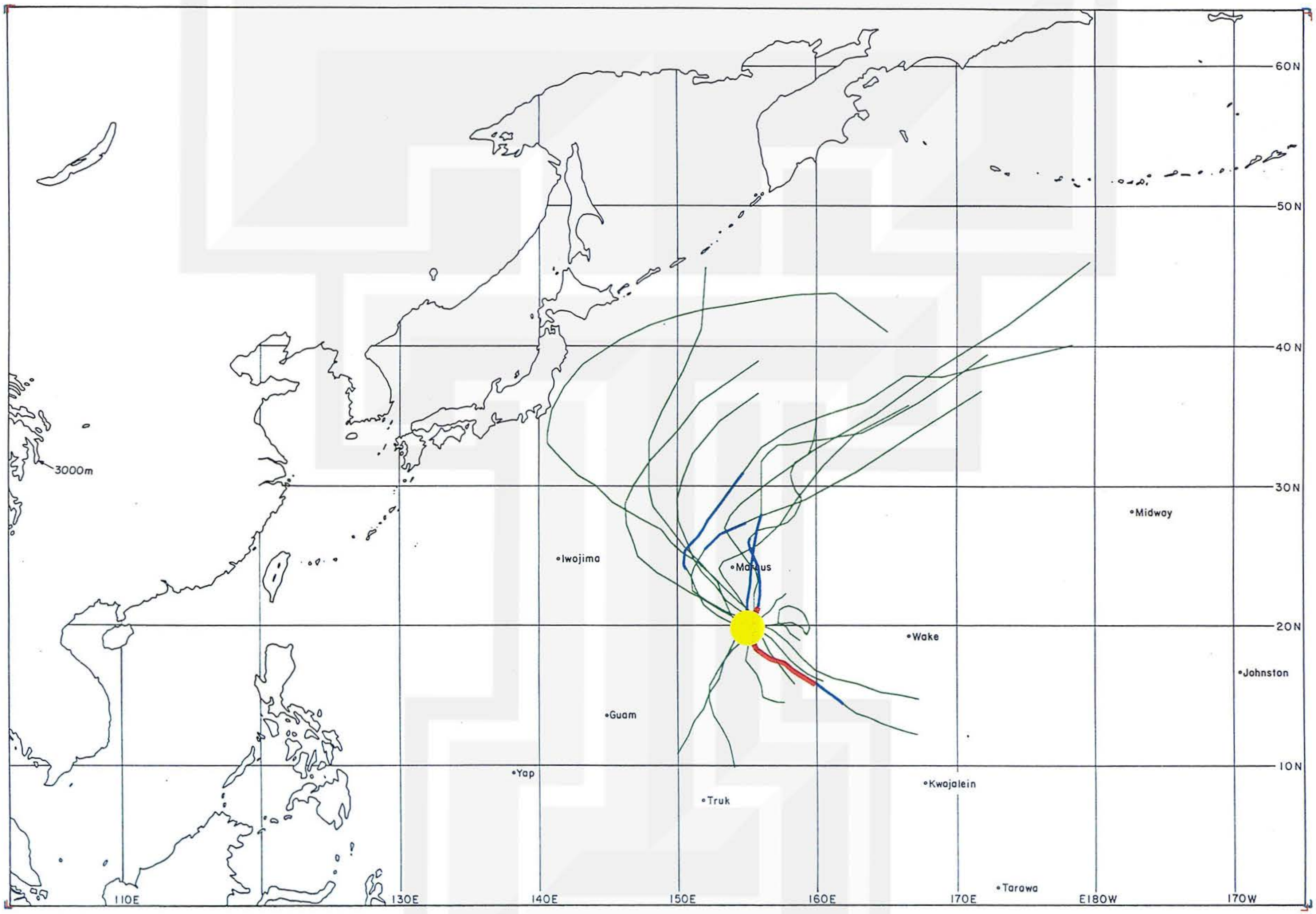

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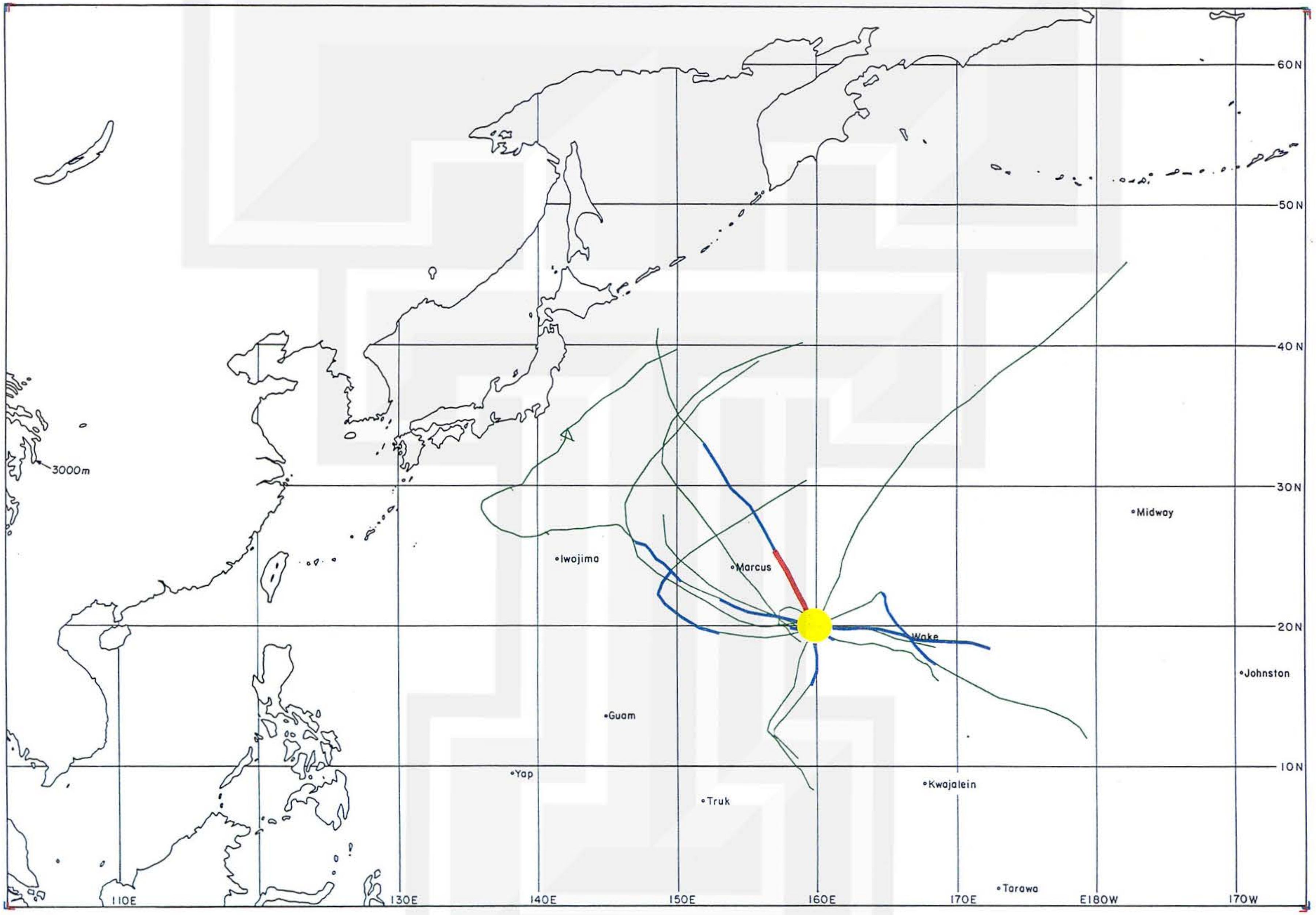
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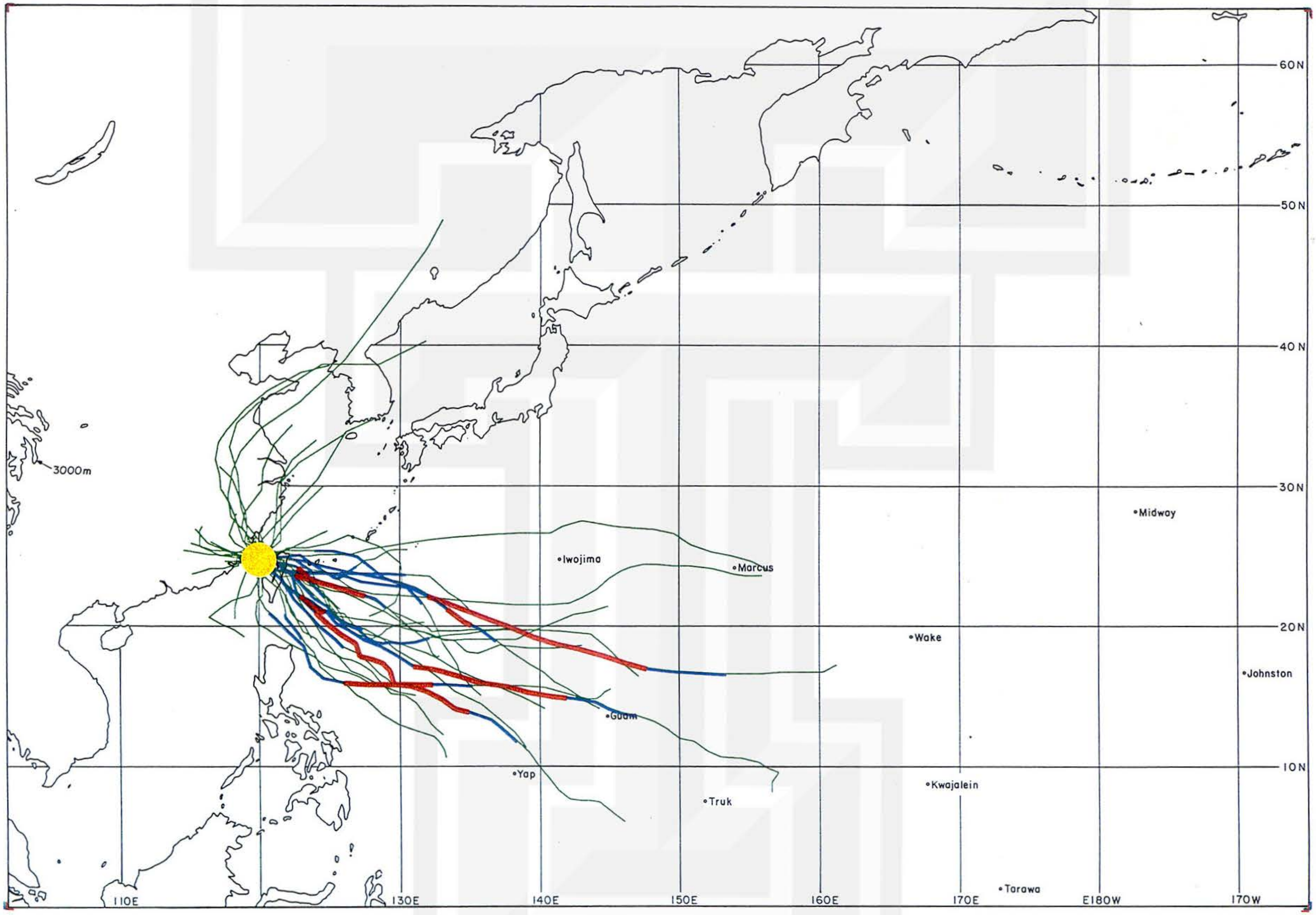

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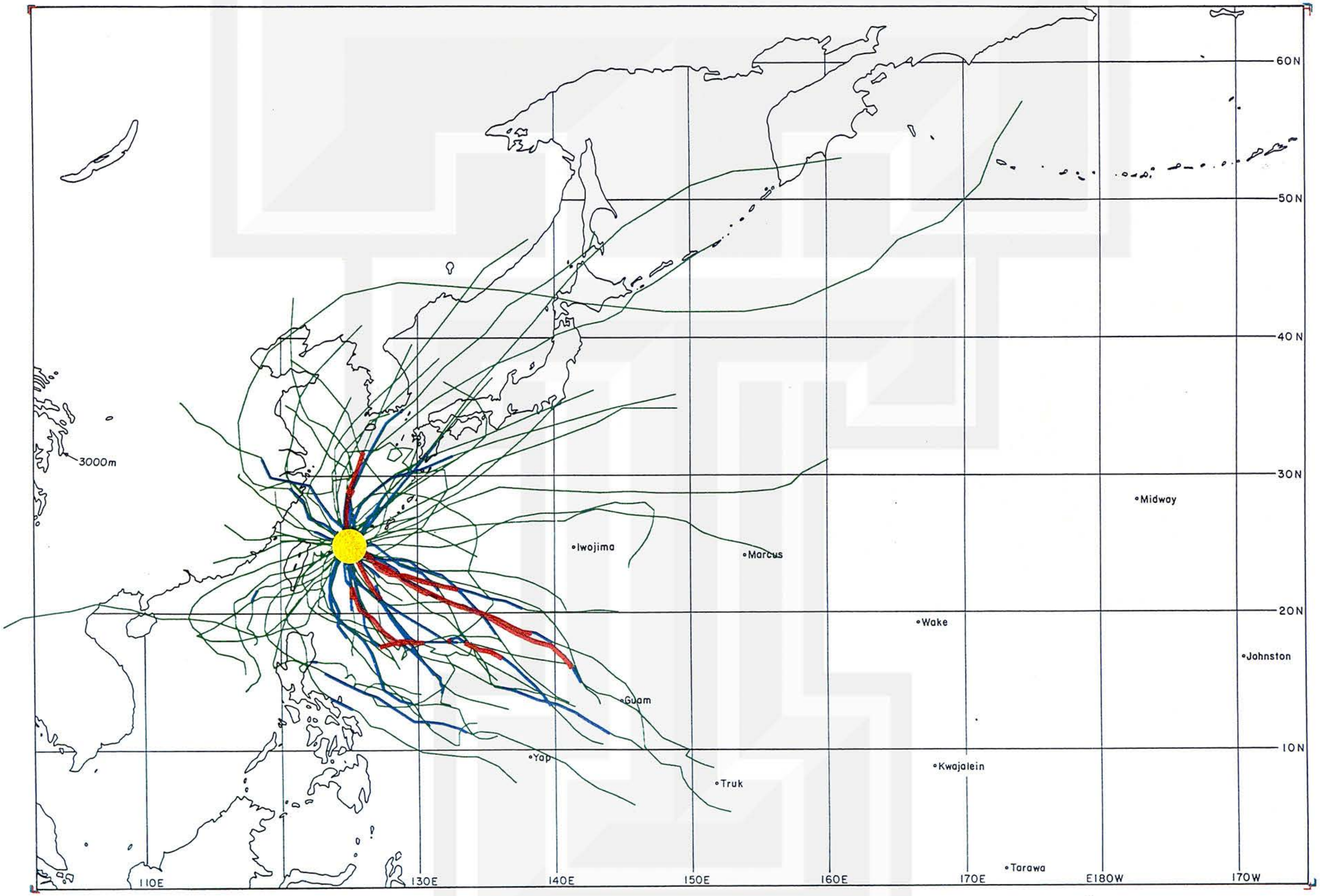

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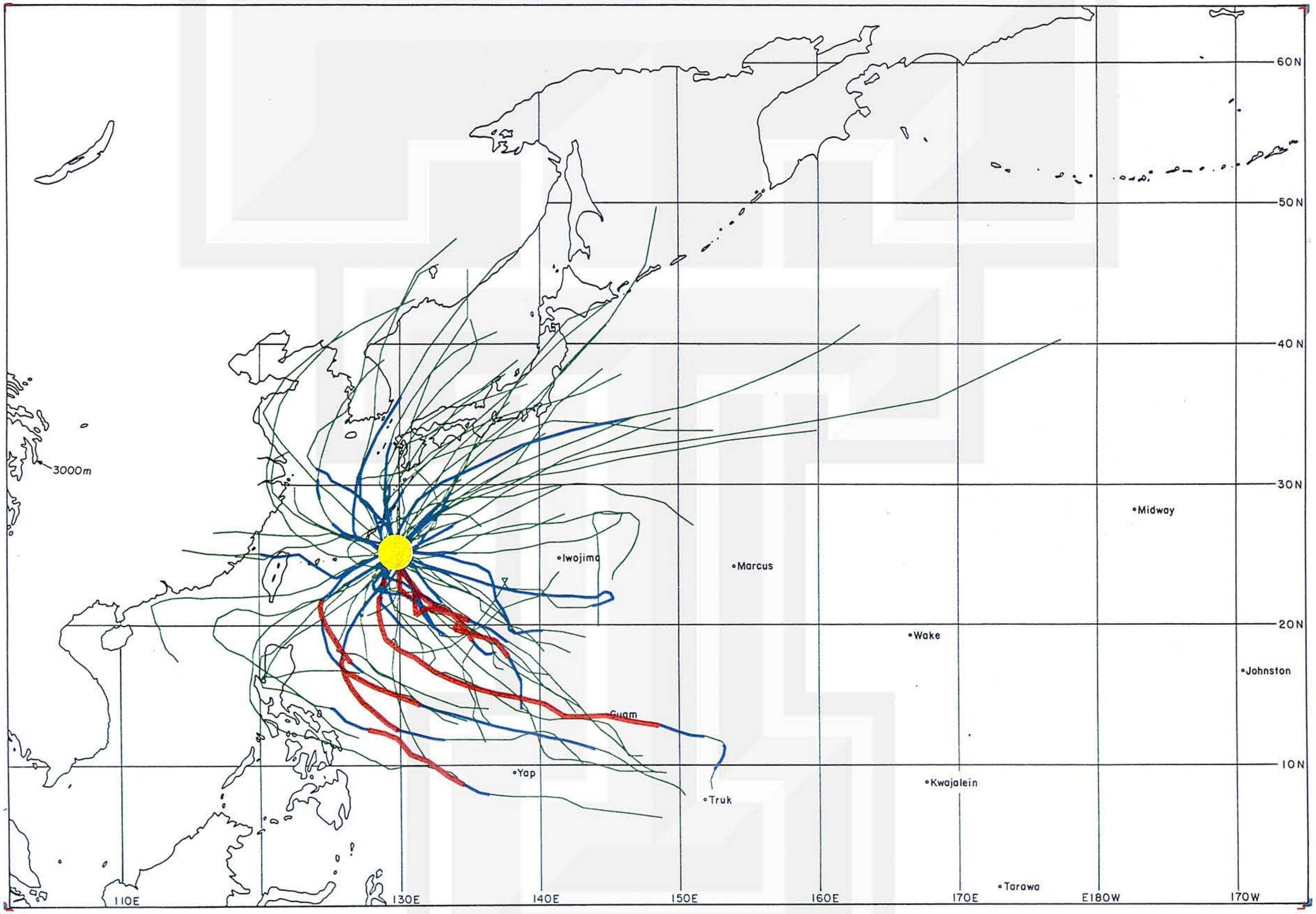

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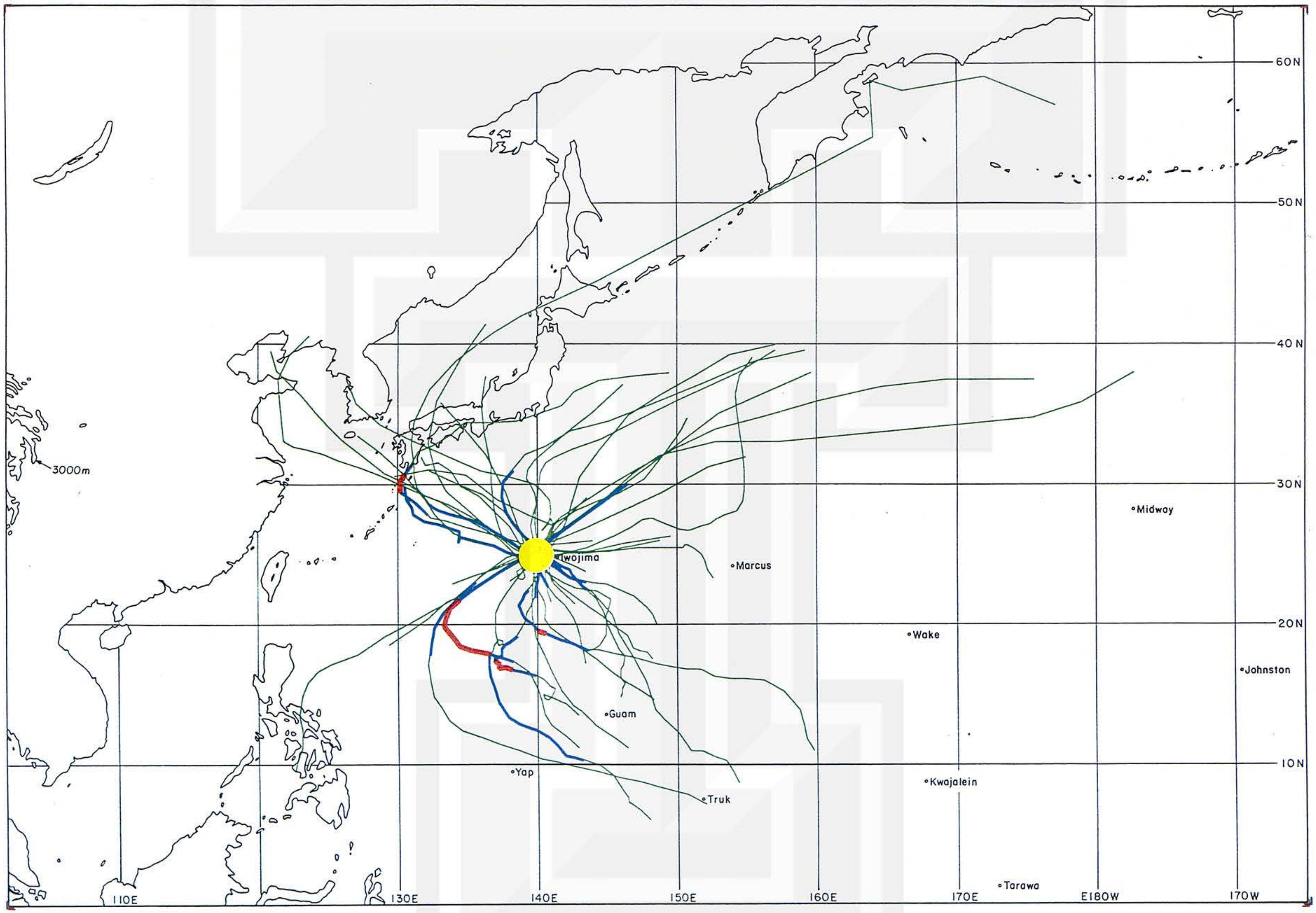

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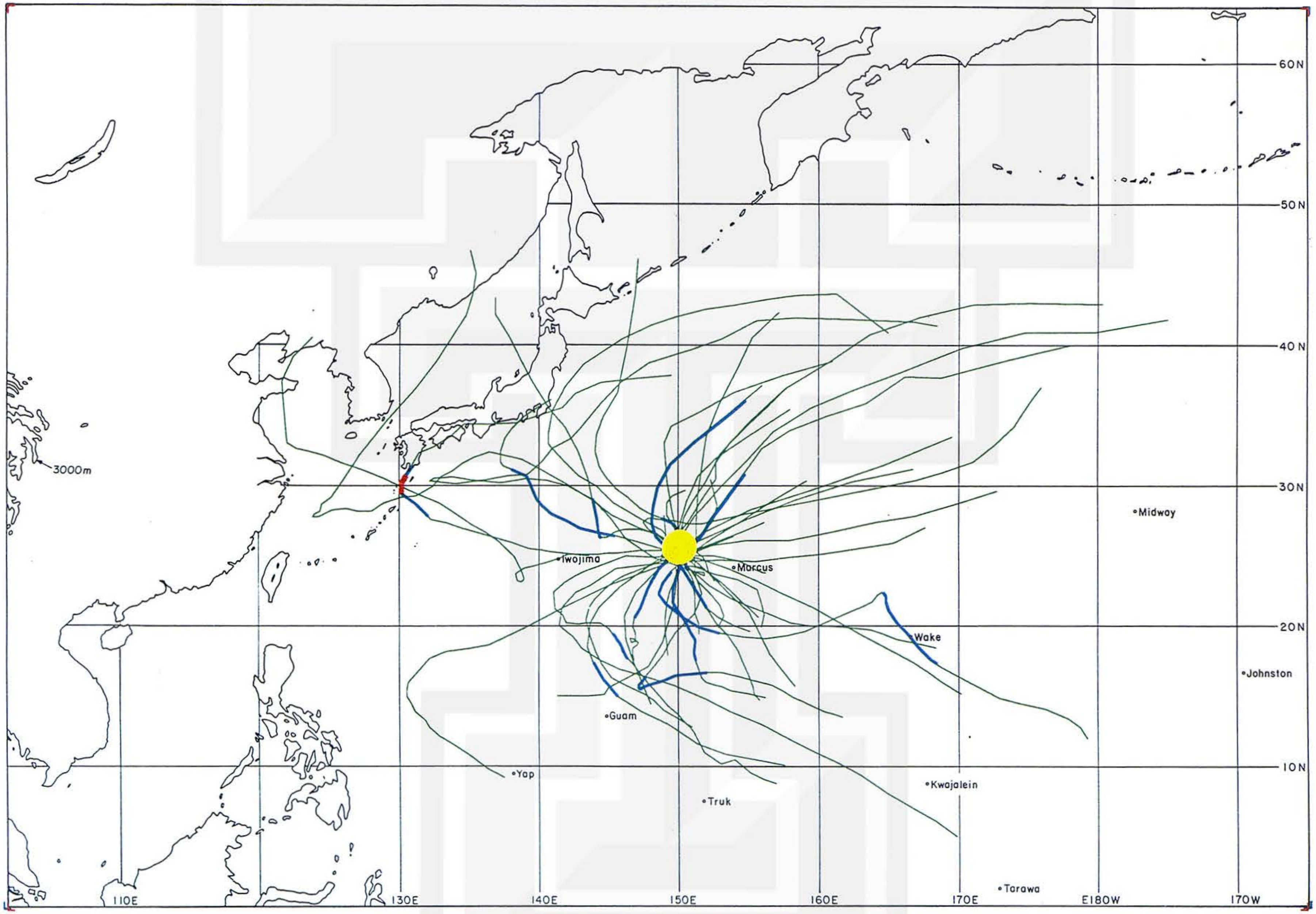

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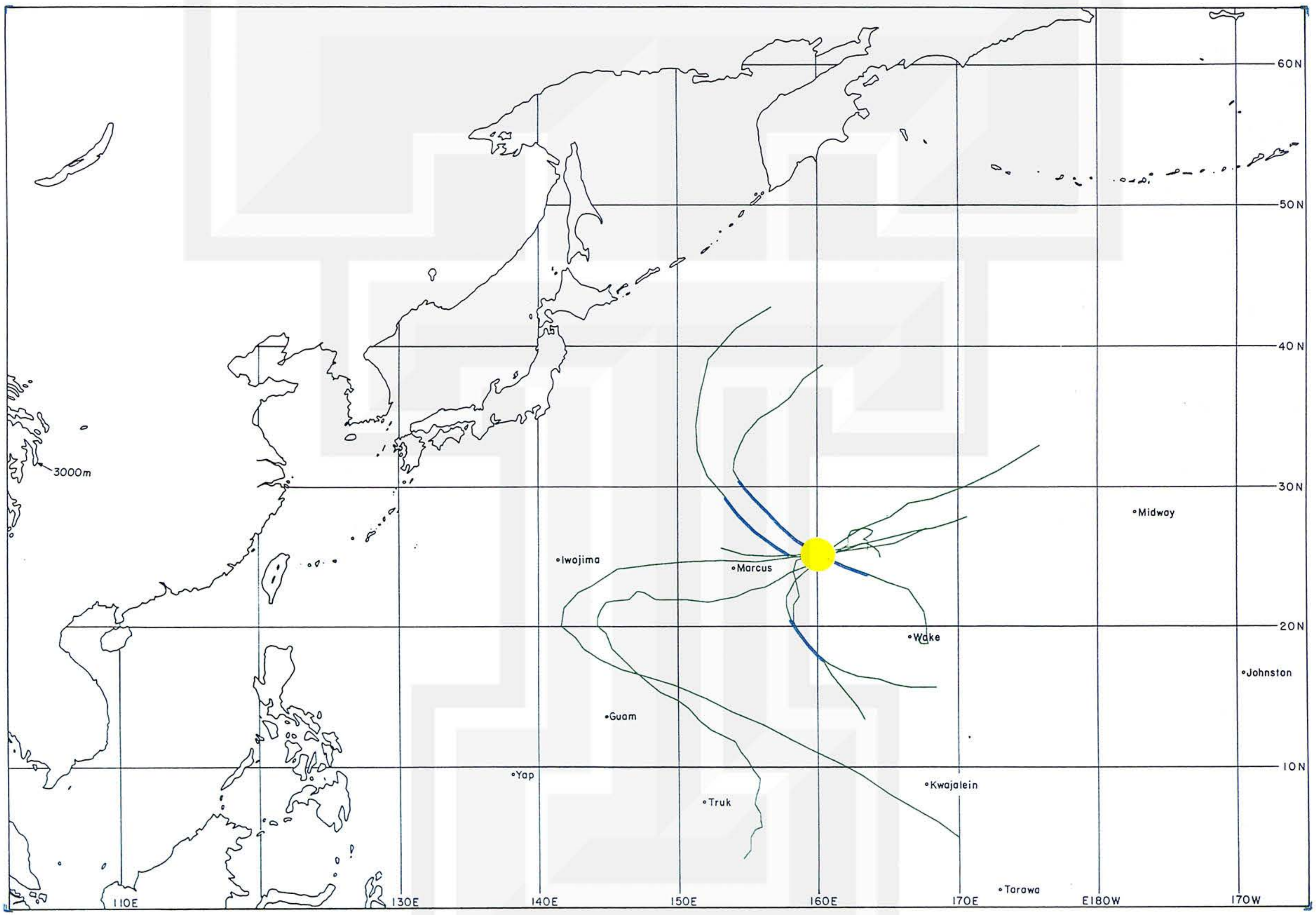

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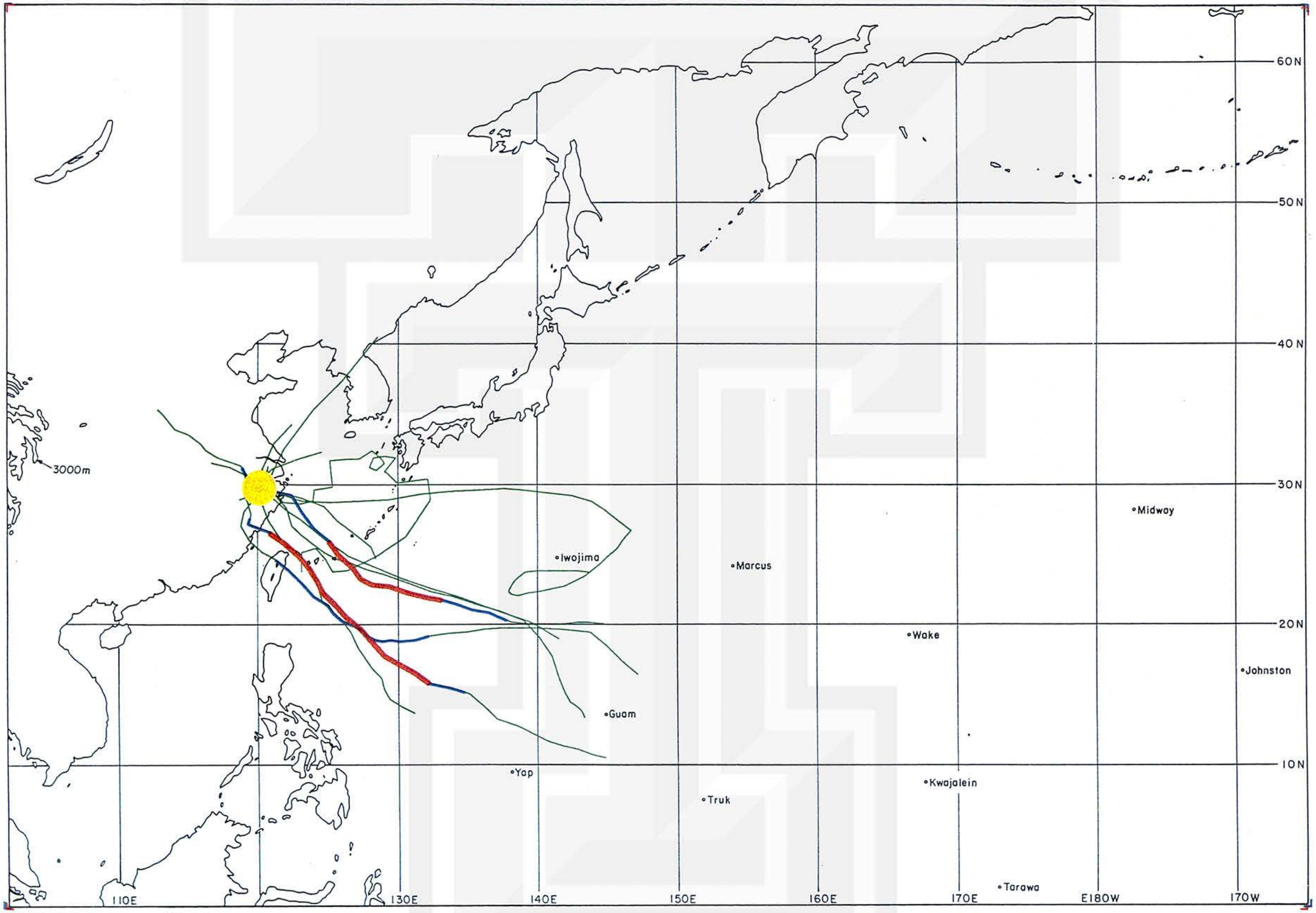
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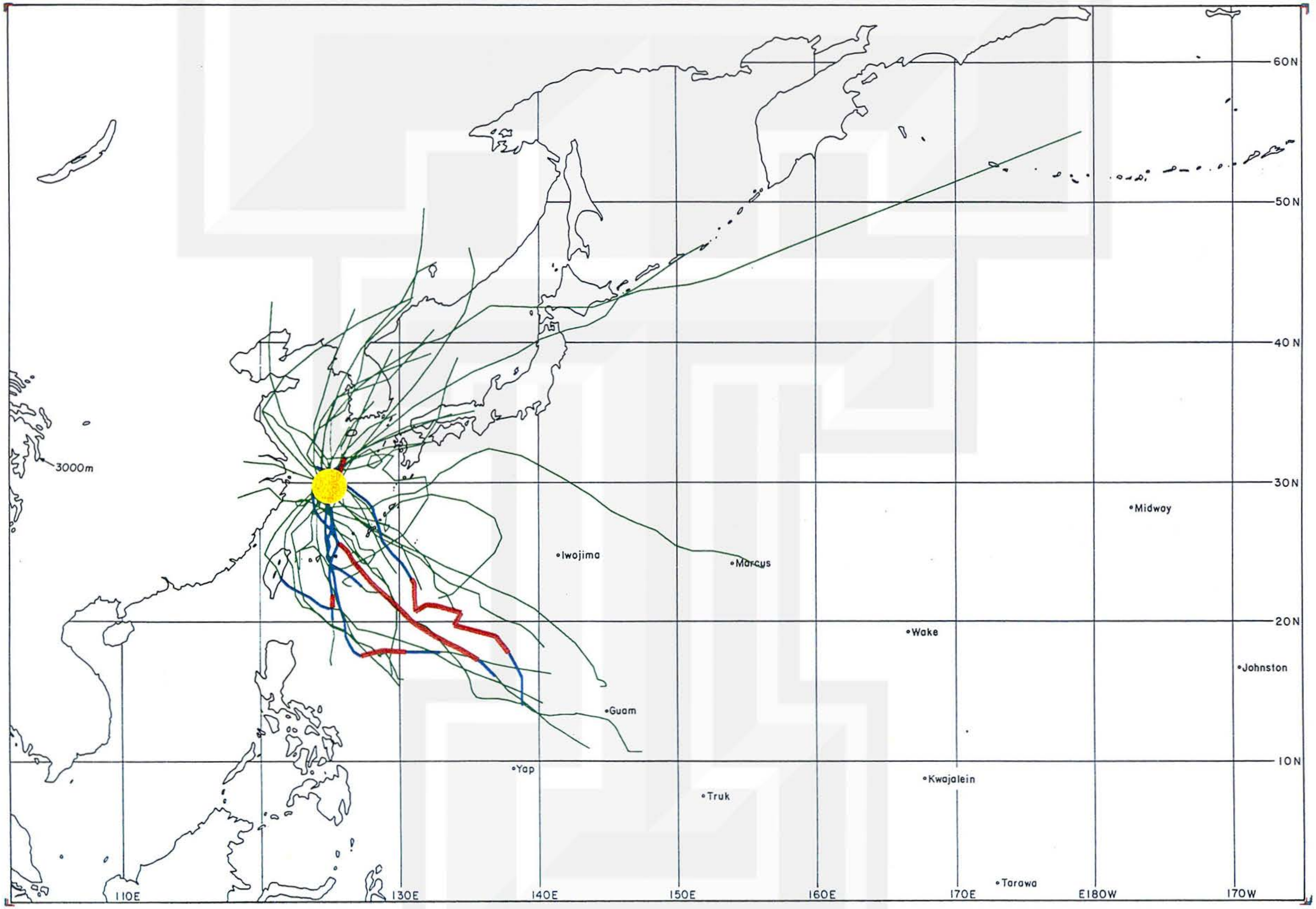
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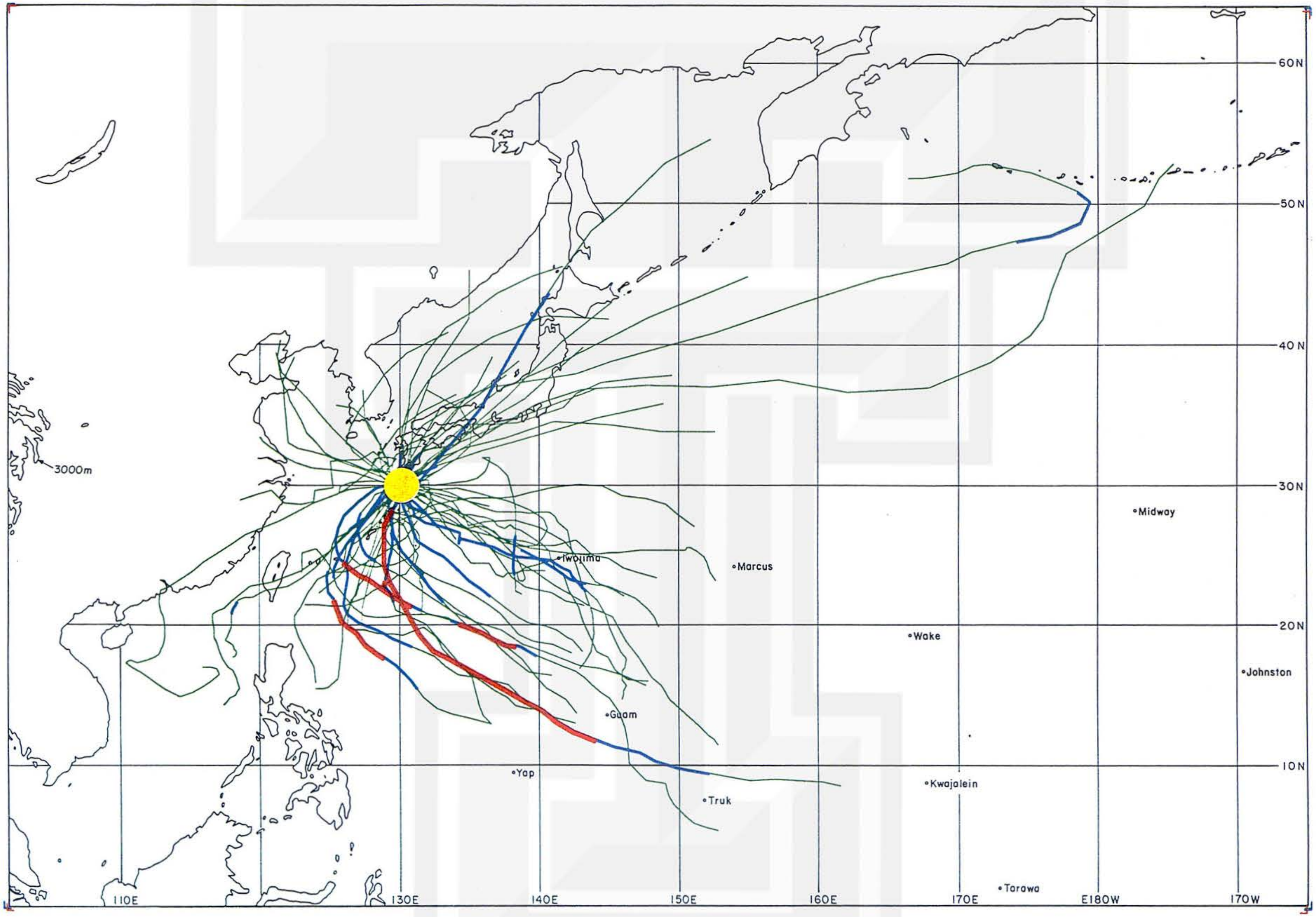
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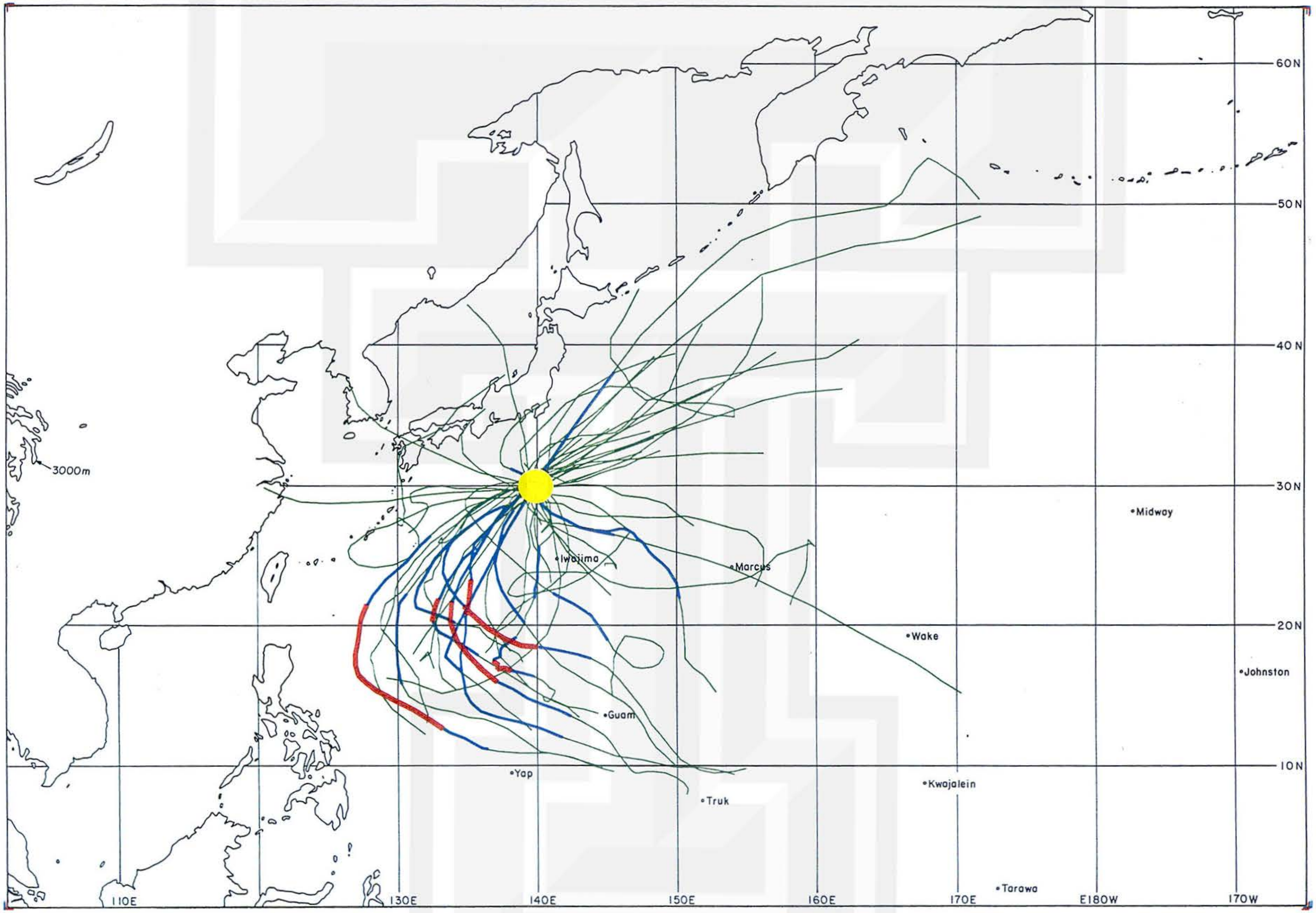

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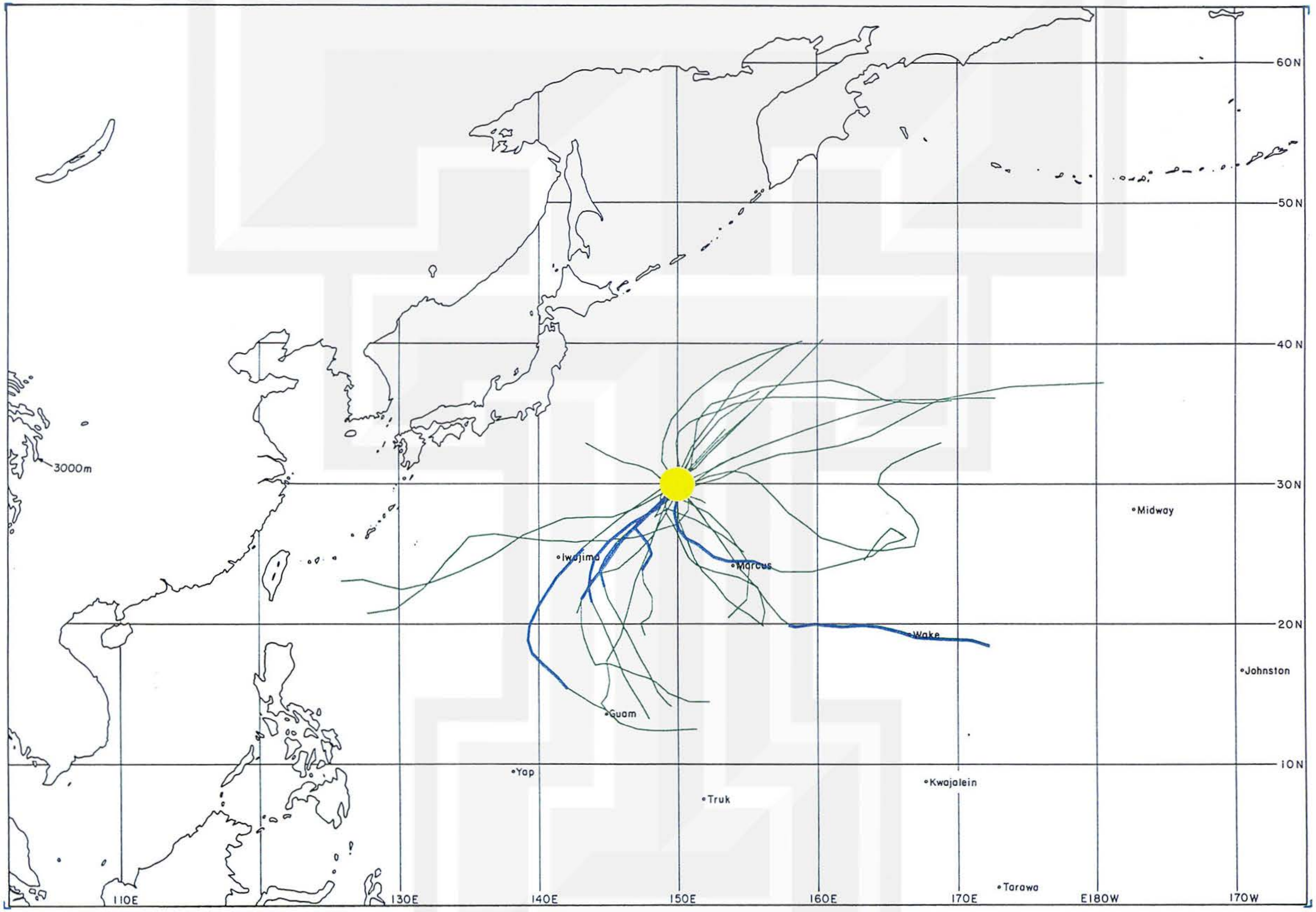
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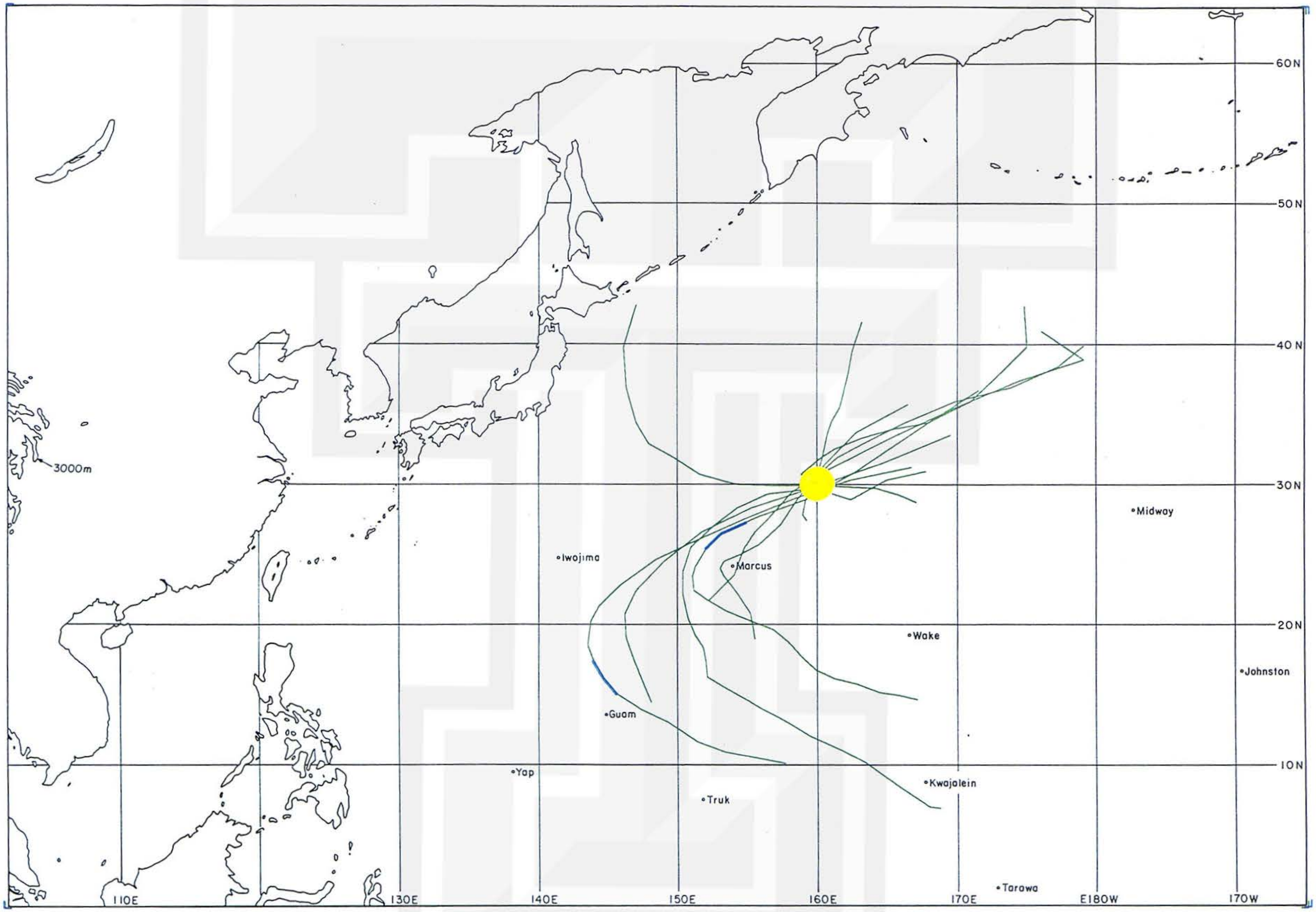

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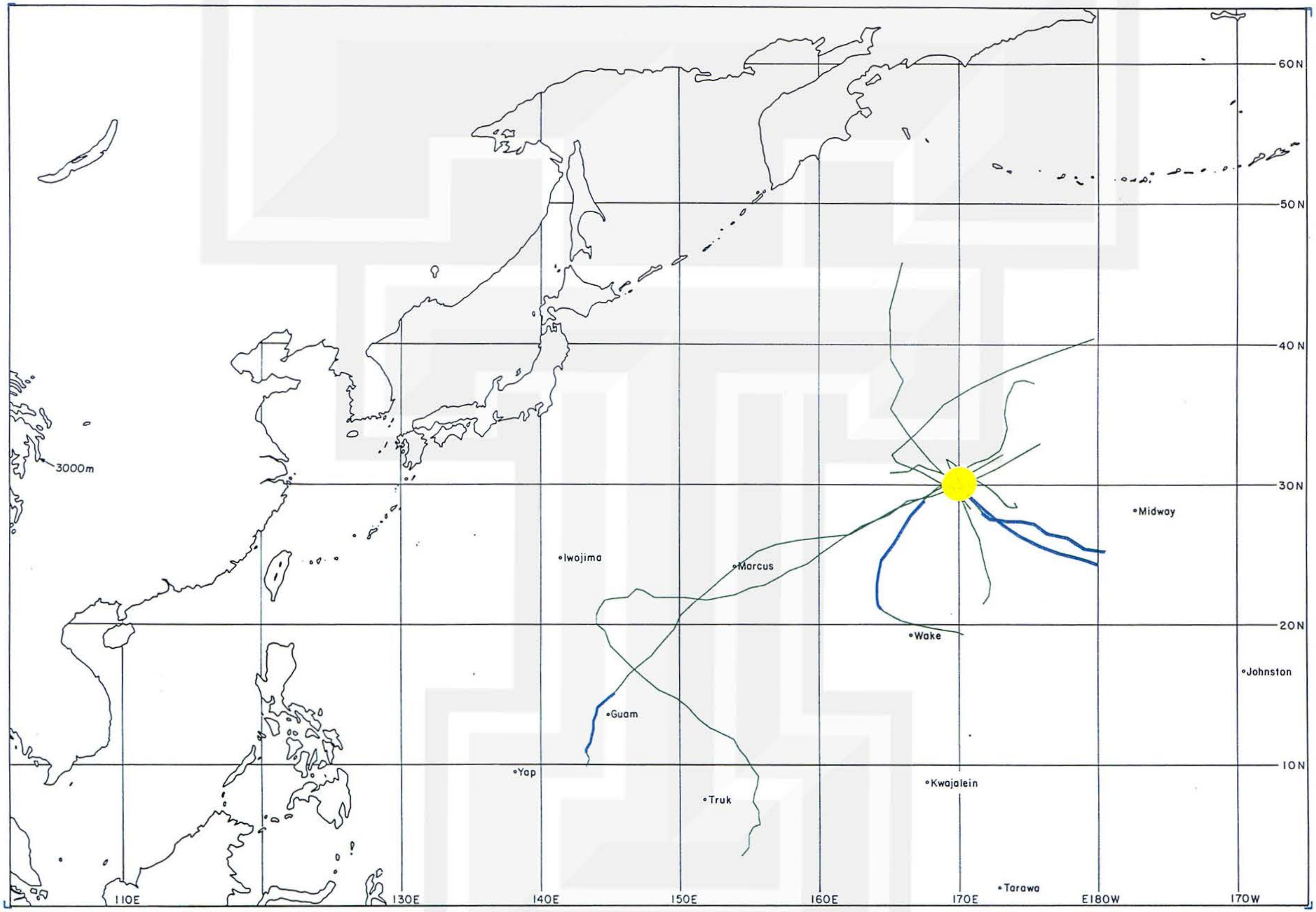
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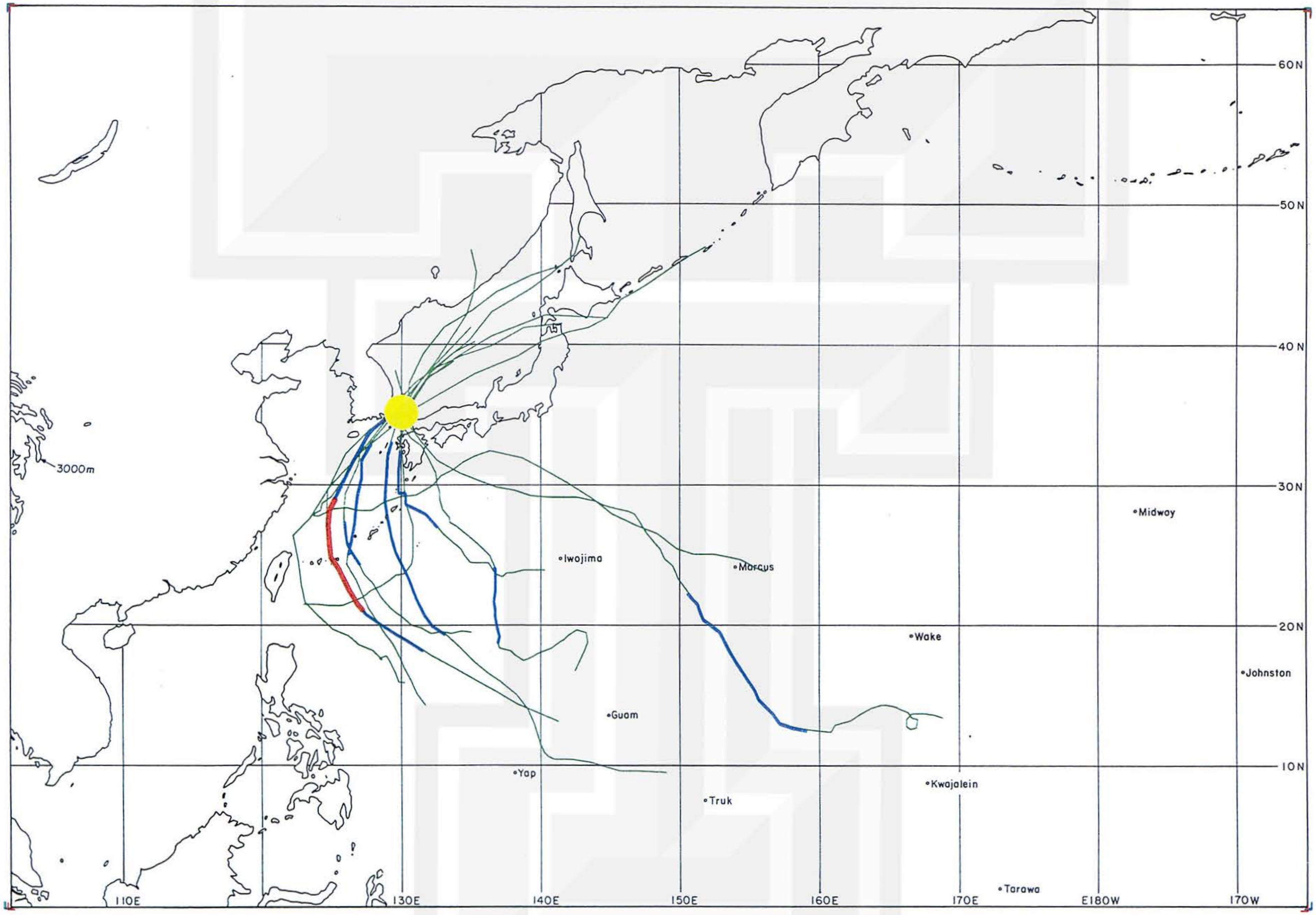
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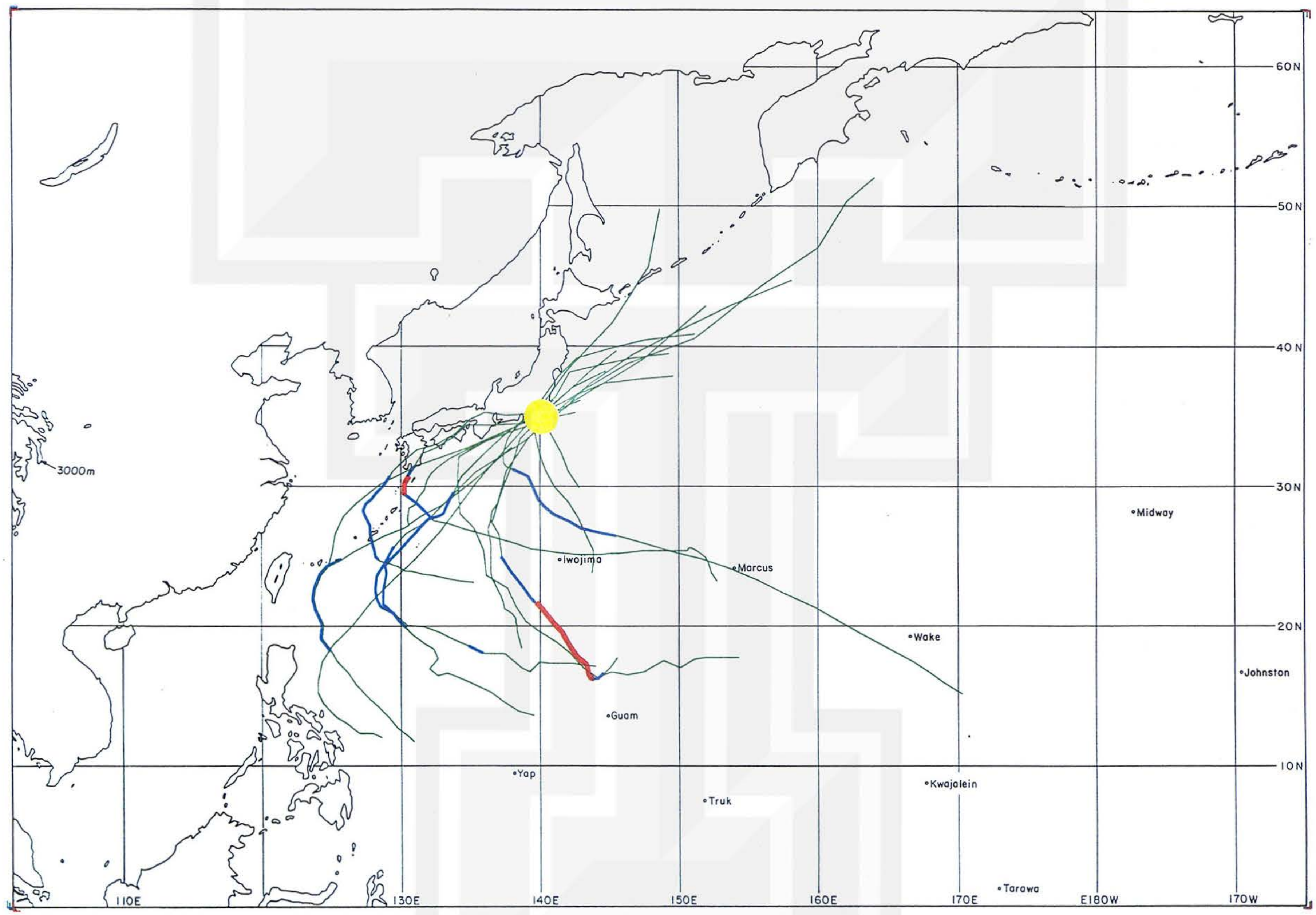
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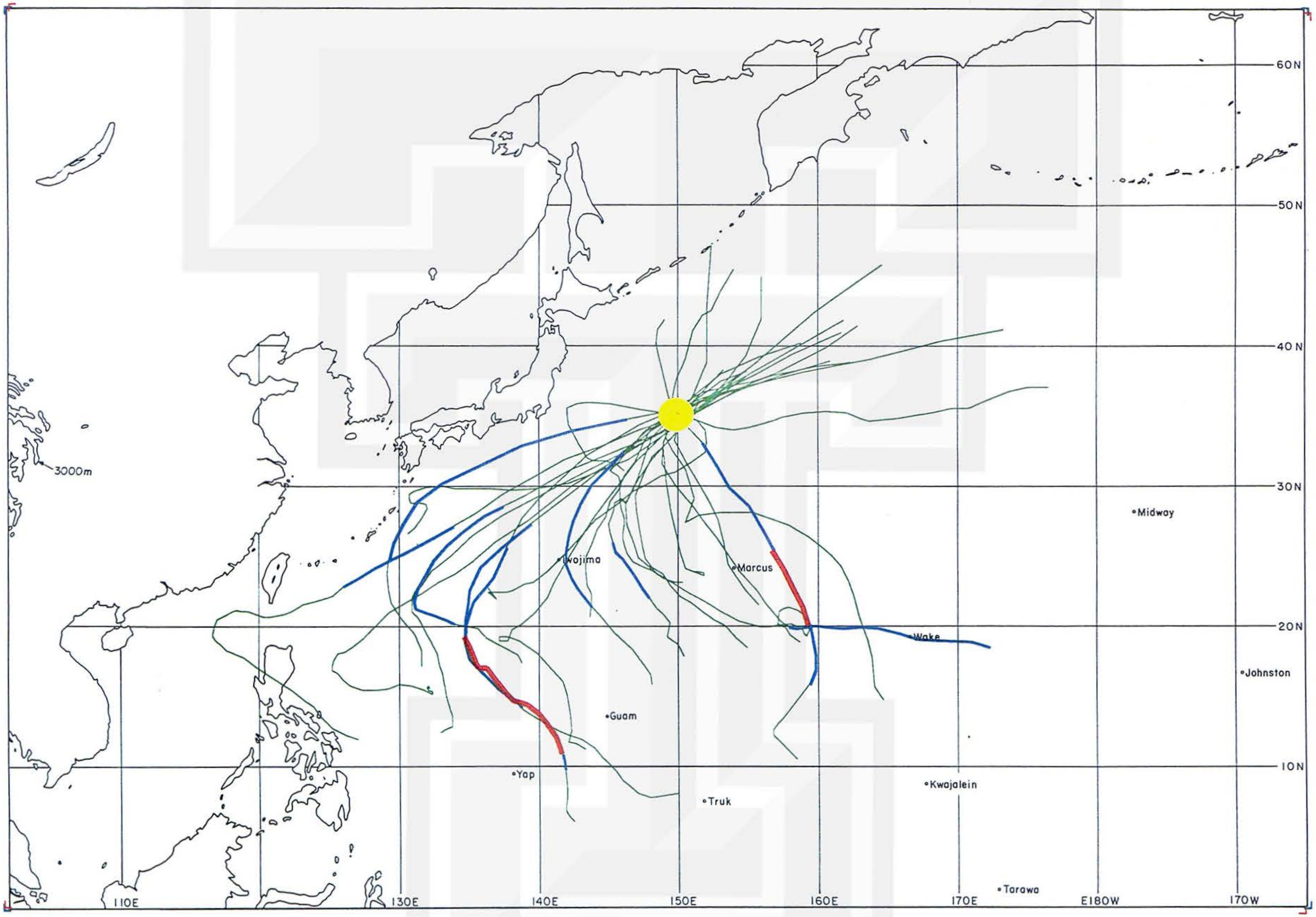

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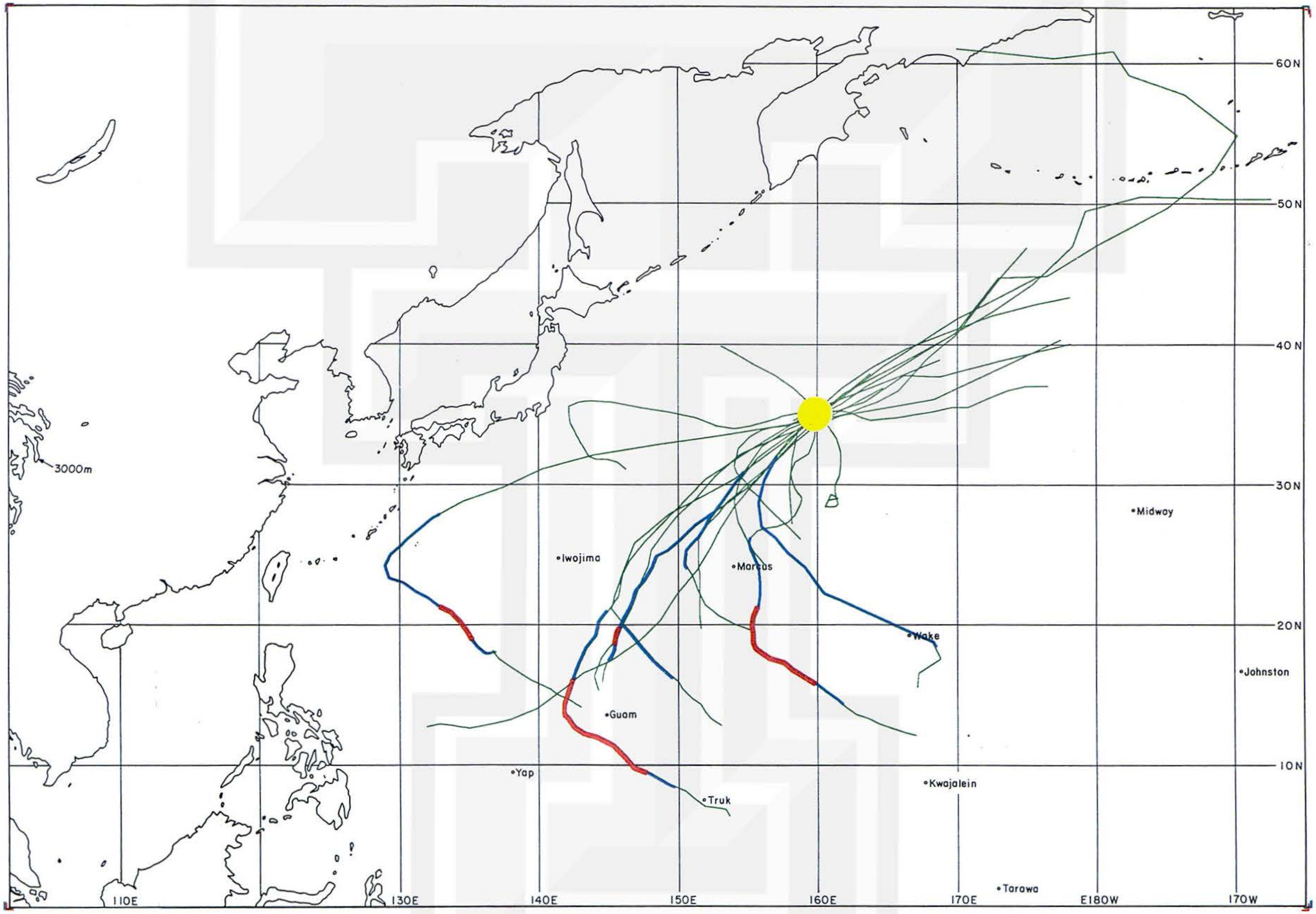
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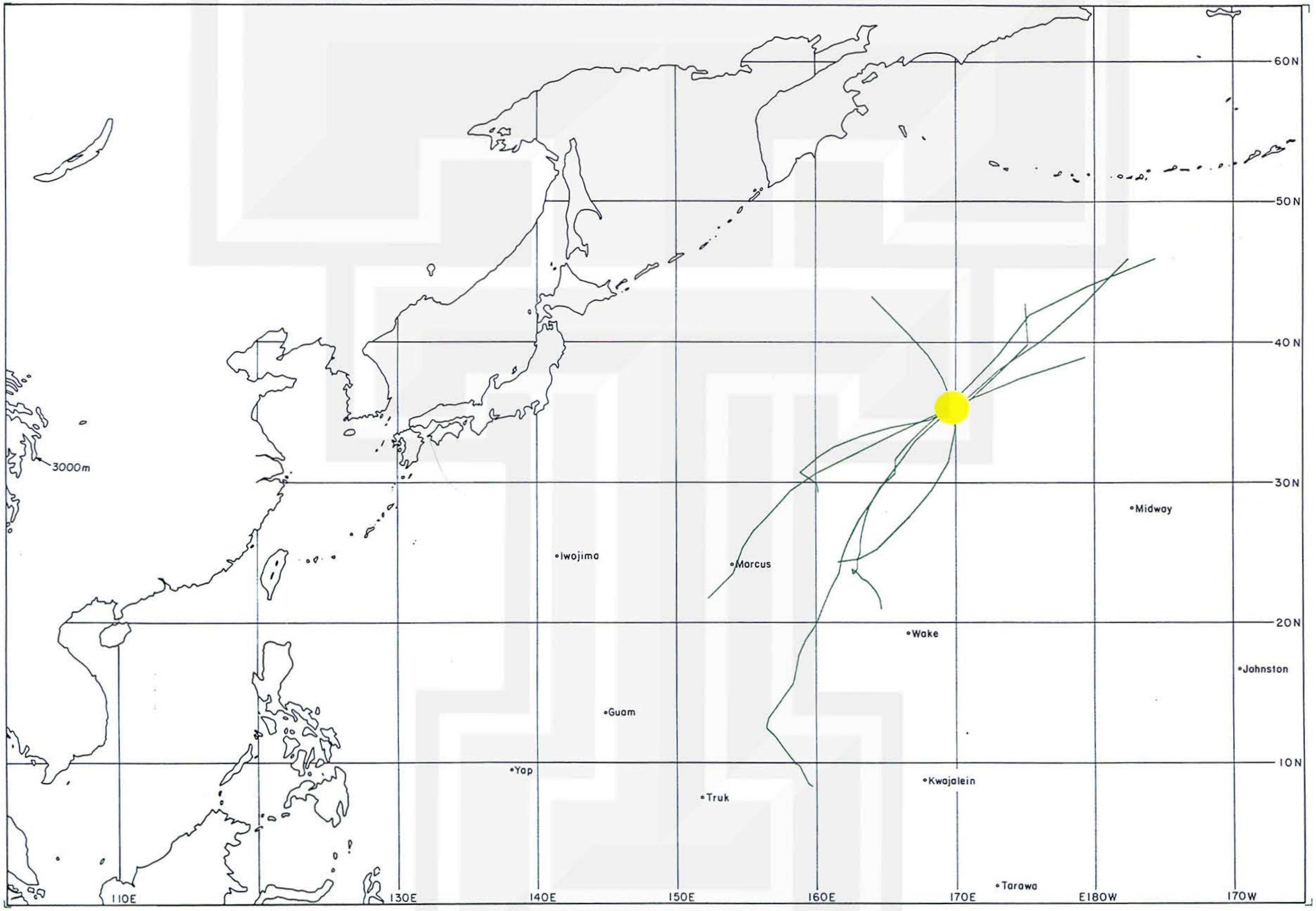

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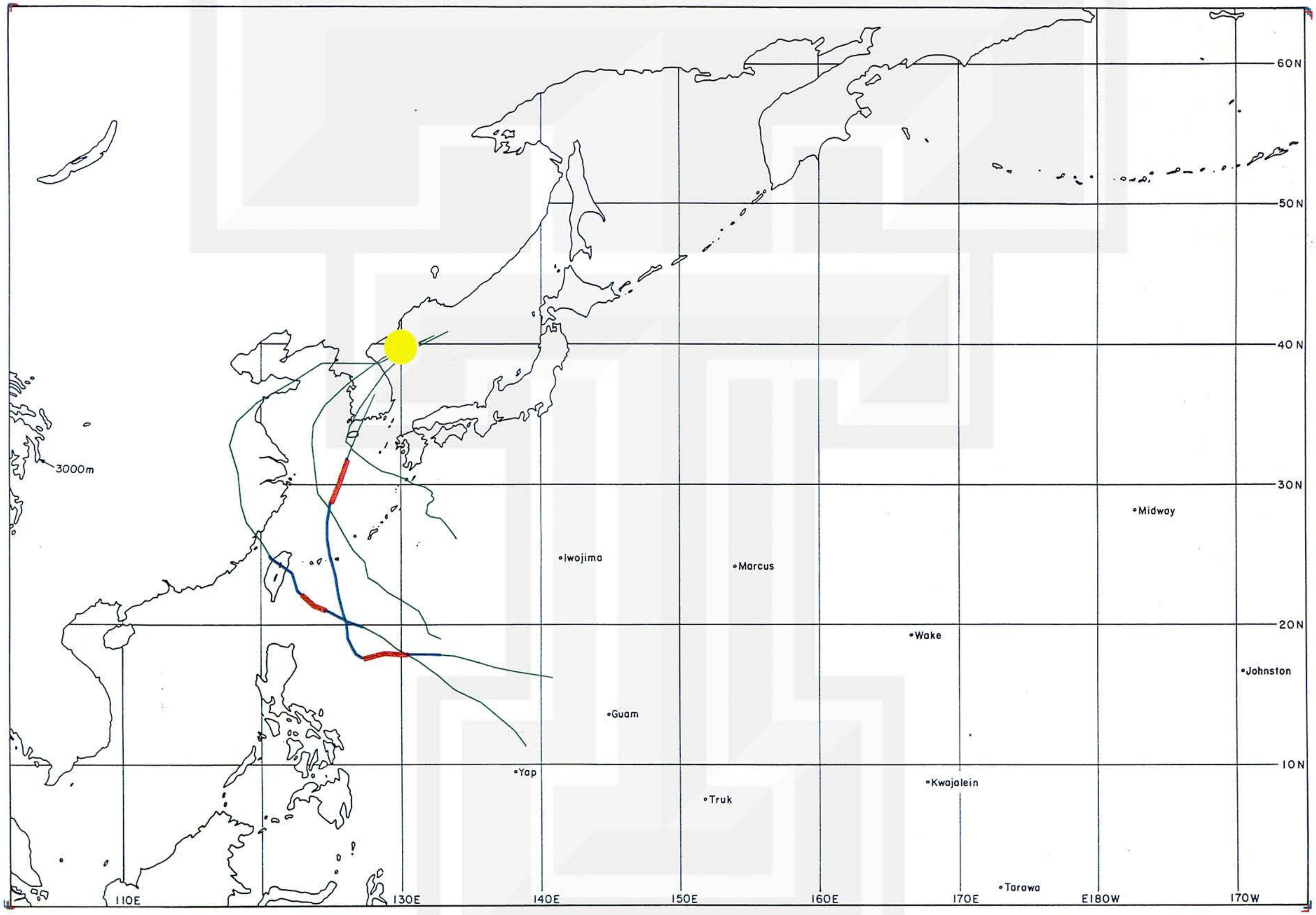
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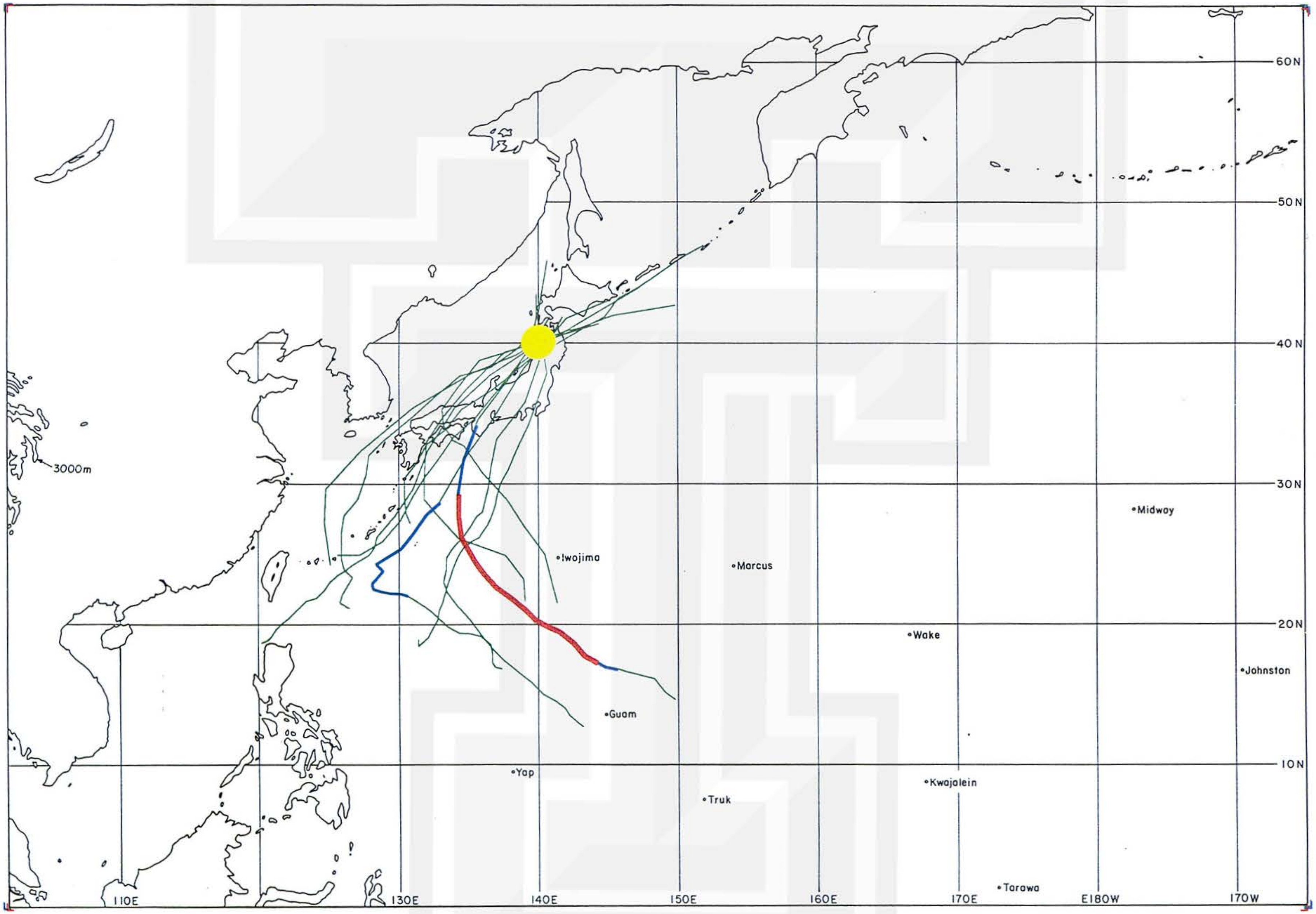
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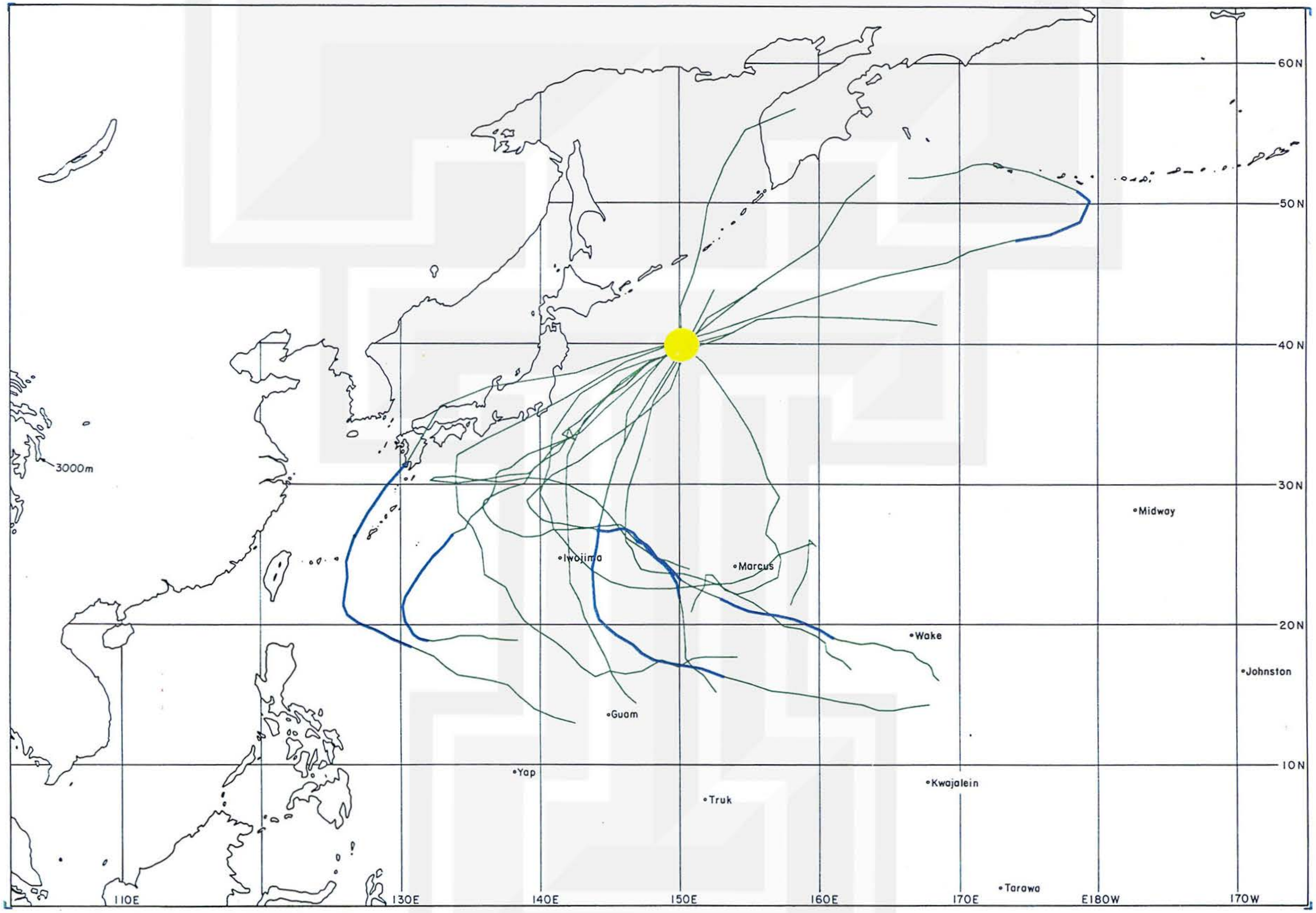
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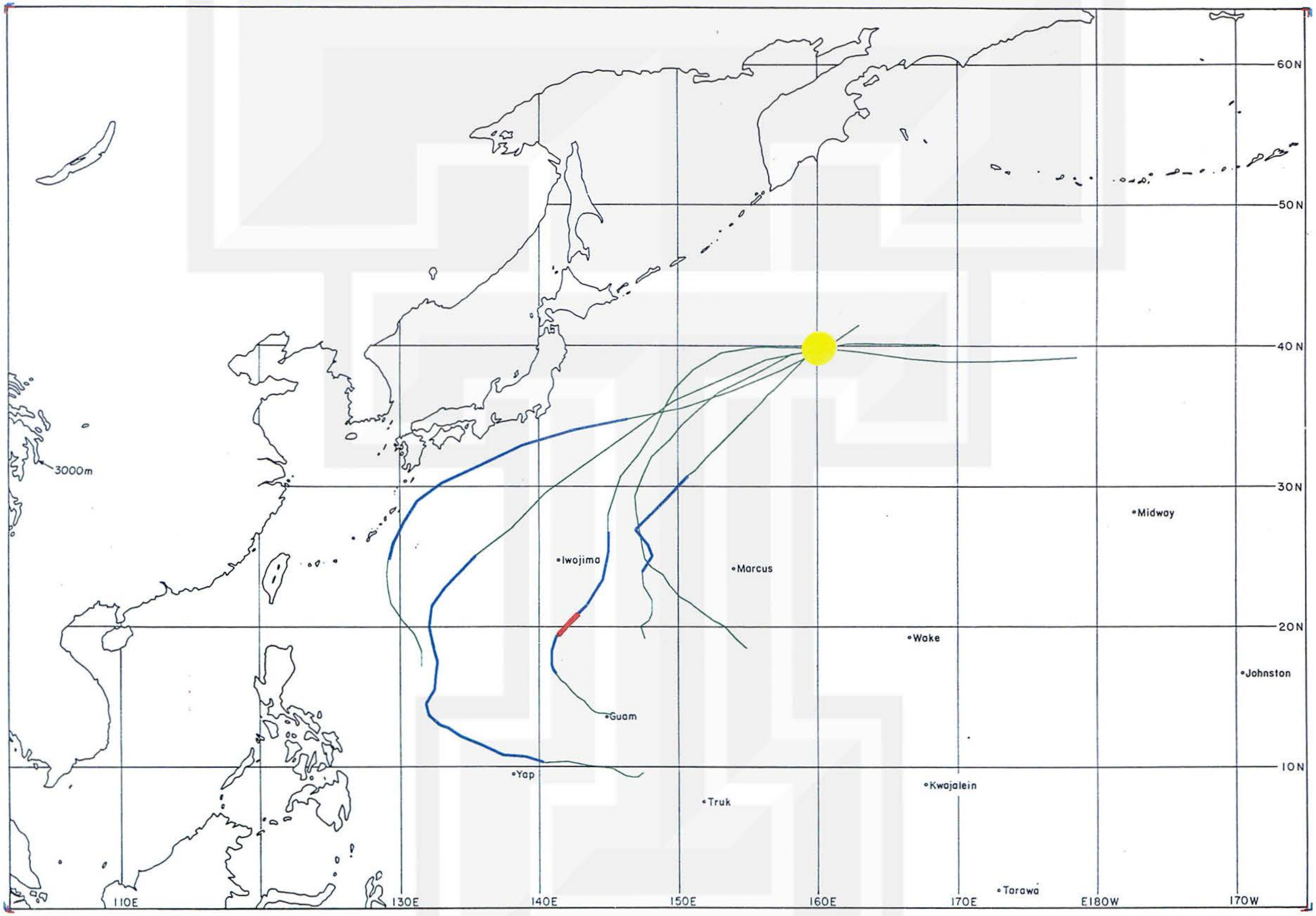
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