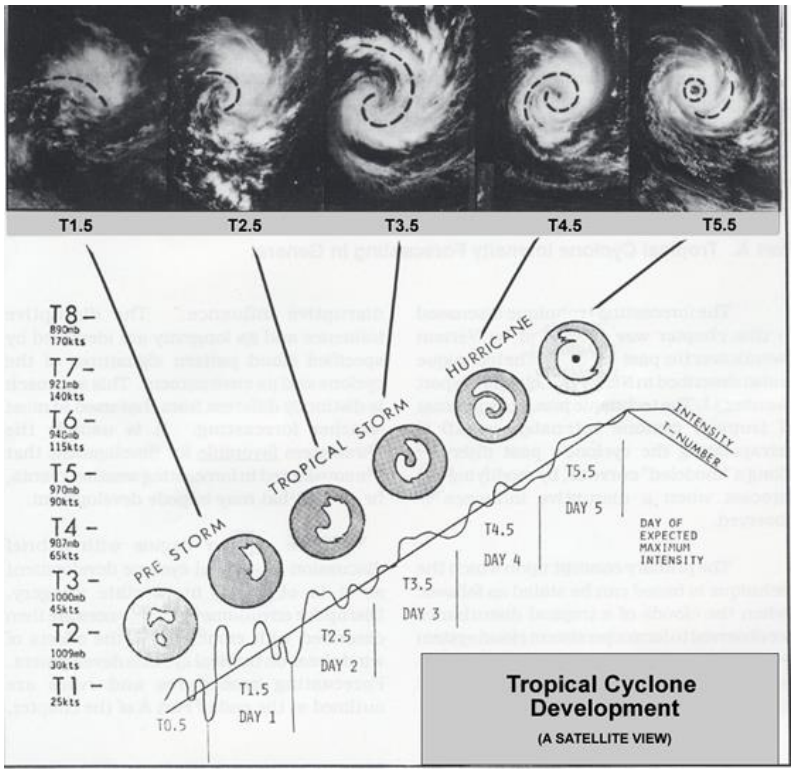
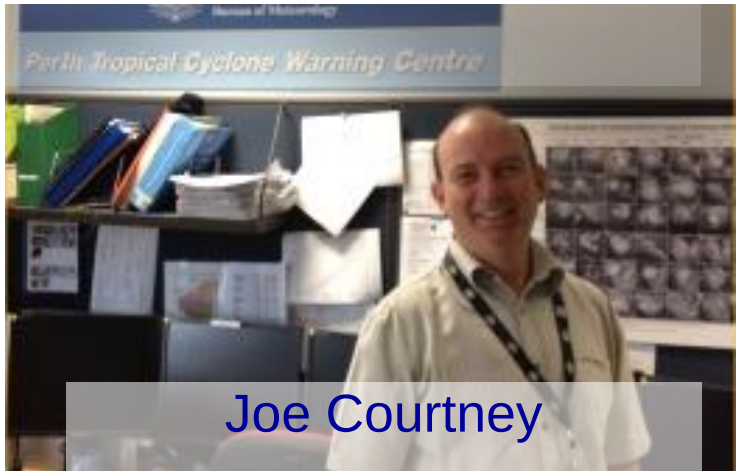
Dvorak Intensity: When to assign initial classification?

Dvorak's criteria for T1

Case study

When to assign T1.5 for initial classification





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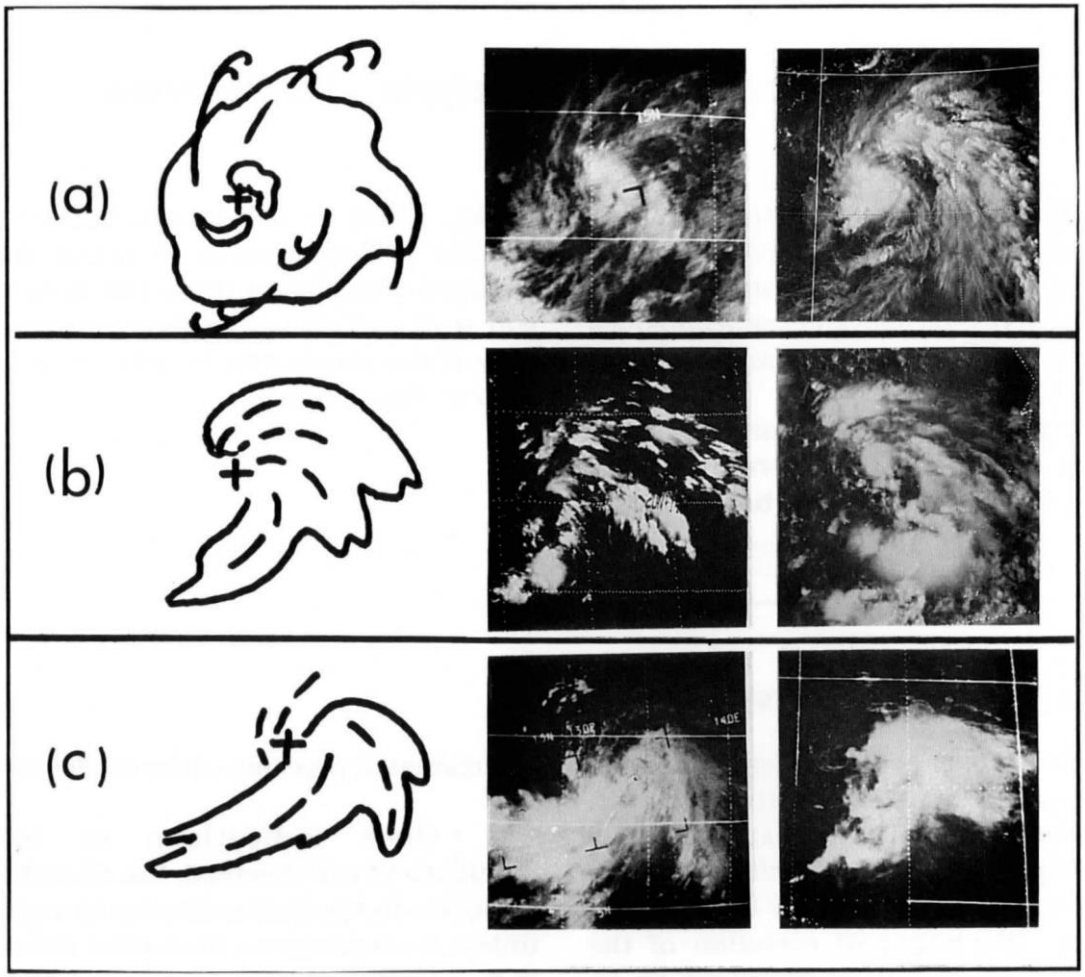
Common T1 cloud patterns (NH)

Principles:
Curved convective cloud

Bands that merge
toward or curve around
a cloud system centre

Reality:
Many variations!



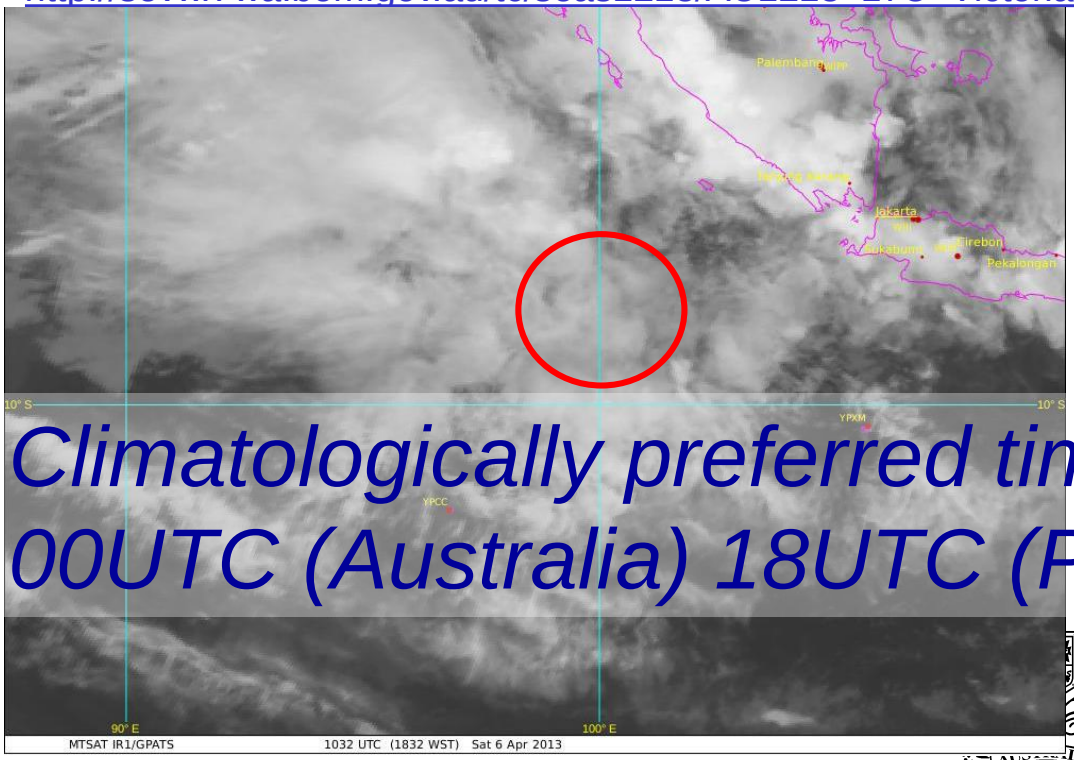
Reference: Fig 3.1 Dvorak, 1995

Dvorak's three criteria for initial classification

"A T1 is first used when a cluster of deep layer convective clouds showing line or band curvature has…"

1. persisted for 12 hours or more

http://sevwx-wa.bom.gov.au/tc/seas1213/AU1213_17U_Victoria/ir_initial_classification.html



Climatologically preferred time is ~8am LST 00UTC (Australia) 18UTC (Pacific)

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Reference: p 32 Dvorak, 1984

Dvorak's three criteria for initial classification

"A T1 is first used when a cluster of deep layer convective clouds showing line or band curvature has…"

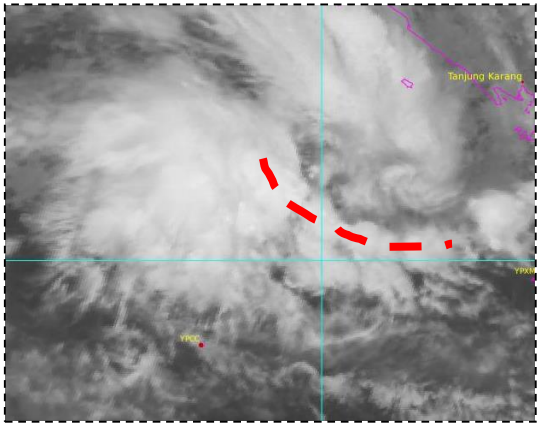
2. a cloud system centre defined within an area having a diameter of 2½° latitude or less which has persisted for 6 hours.

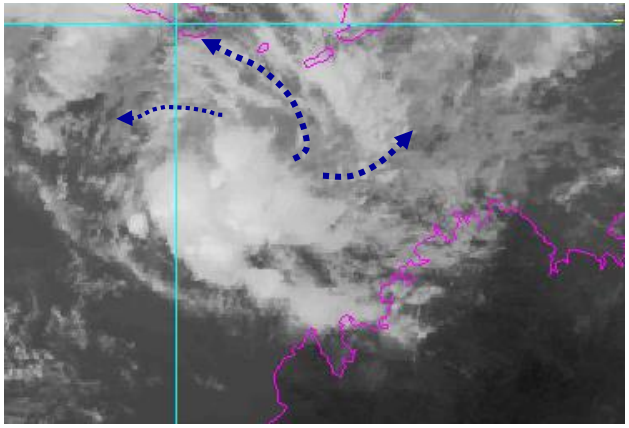
What defines a cloud system centre?

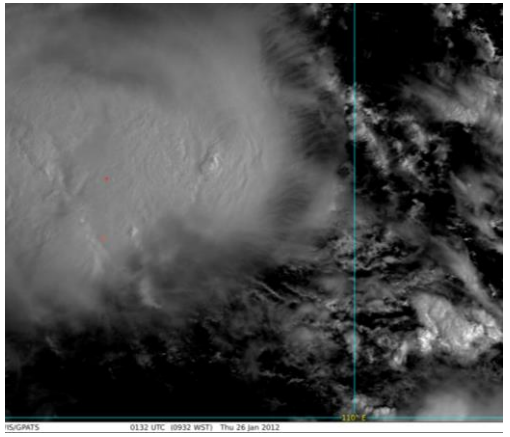
2. Cloud system centre

a. curved band - ~0.2 curvature on log10 spiral.
b. curved cirrus lines indicating a centre of curvature within or near dense overcast cloud.

c. curved low level cloud lines showing a centre of curvature within 2 degrees of a cold cloud mass.



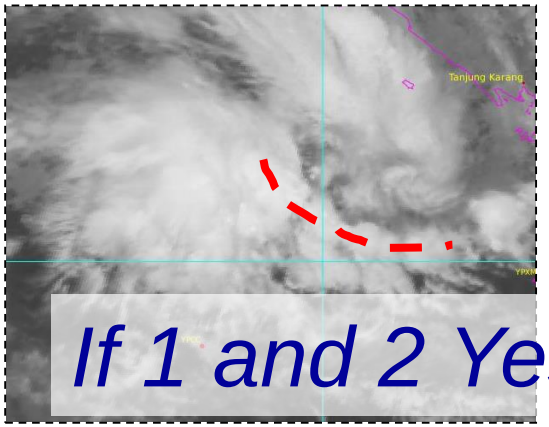


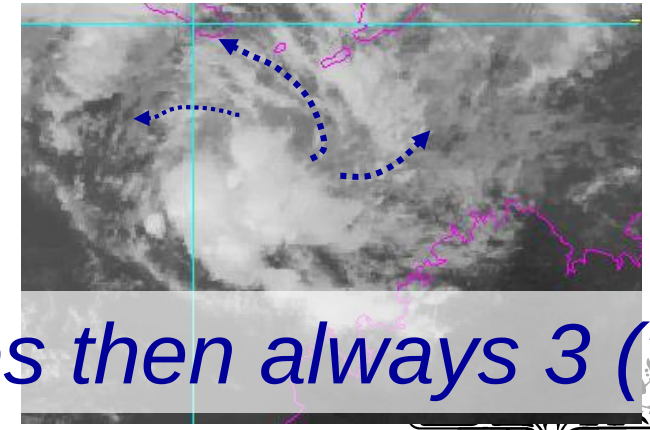


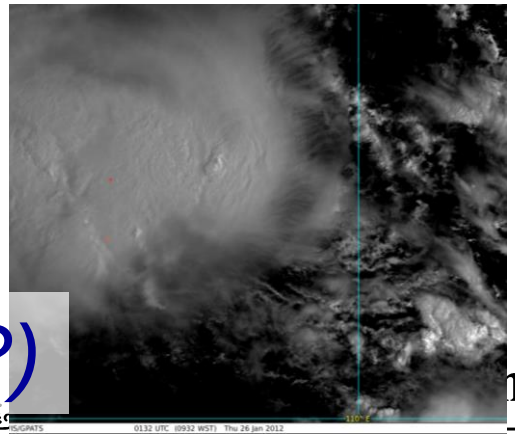
Dvorak's three criteria for initial classification

"A T1 is first used when a cluster of deep layer convective clouds showing line or band curvature has…"

3. It has an area of dense, cold (DG or colder) overcast* of >1½° in extent that appears less than 2° from the centre. The overcast may also appear in cumulonimbus lines that curve around the centre.



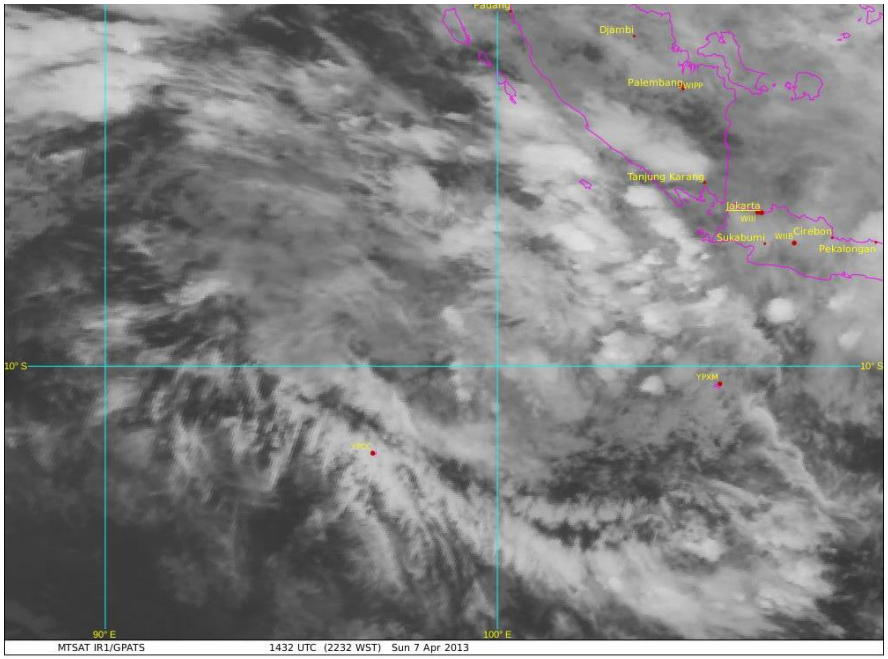


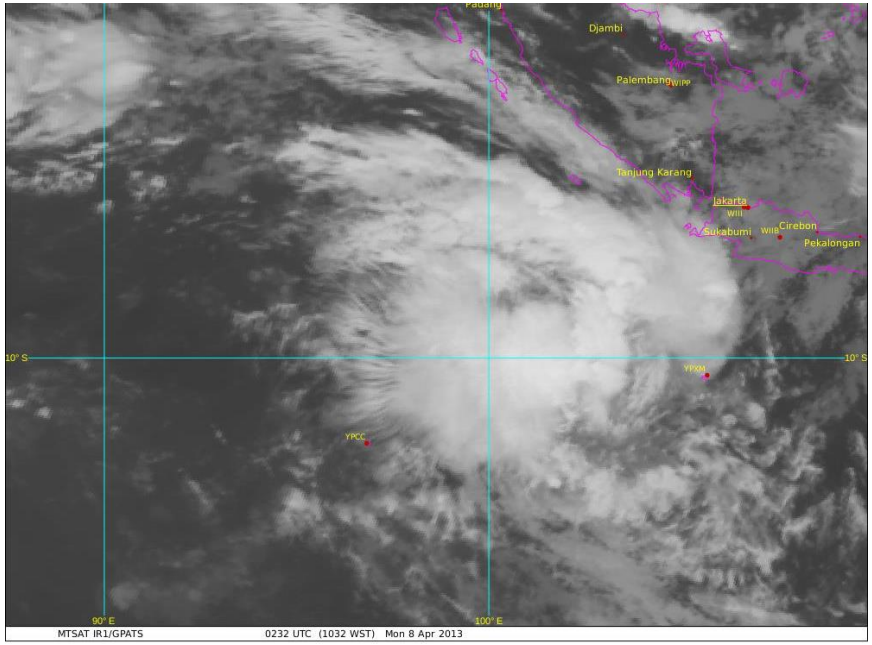


If 1 and 2 Yes then always 3 (?)

Case study: pre-Victoria 2013

http://sevwx-wa.bom.gov.au/tc/seas1213/AU1213_17U_Victoria/ir_genesis.html





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When to assign 1.5?

1. the environment is highly favourable for development:

low shear, strong low level convergence, upper level divergence, and high ocean heat content, high moisture content in low-mid levels…

2. broad low-mid level circulation:

rapid development may occur when a low/mid level circulation has formed with less than 12h of focussed central convection.

e.g. low moving offshore esp over high SSTs (Top End/north Kimberley)

3. small circulation:

small TCs are known to spin up faster than the standard Dvorak model.

If more than one of above suggest relaxing Dvorak FT constraints (Step 8)

Summary

1. Reviewed the criteria for initial T1 classification

2. Use 1.5 for initial classification for faster development cases

CAUTION: The danger of being pedantic in NOT assigning T1 is to be behind the intensification curve.
Can revise estimate of initial classification later when it is easier

Refer to Cyclogenesis wiki notes for criteria

References:

Dvorak, 1984 Tropical Cyclone Intensity Analysis Using Satellite Data.
http://www.virtuallab.bom.gov.au/index.php/download_file/view/39/163/

Dvorak, 1995 A Workbook on Tropical Clouds and Cloud Systems Observed in Satellite Imagery Vol II.

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