When do Seasons Change?

Structure & Definition of a Yolngu Calendar, NE Arnhem Land

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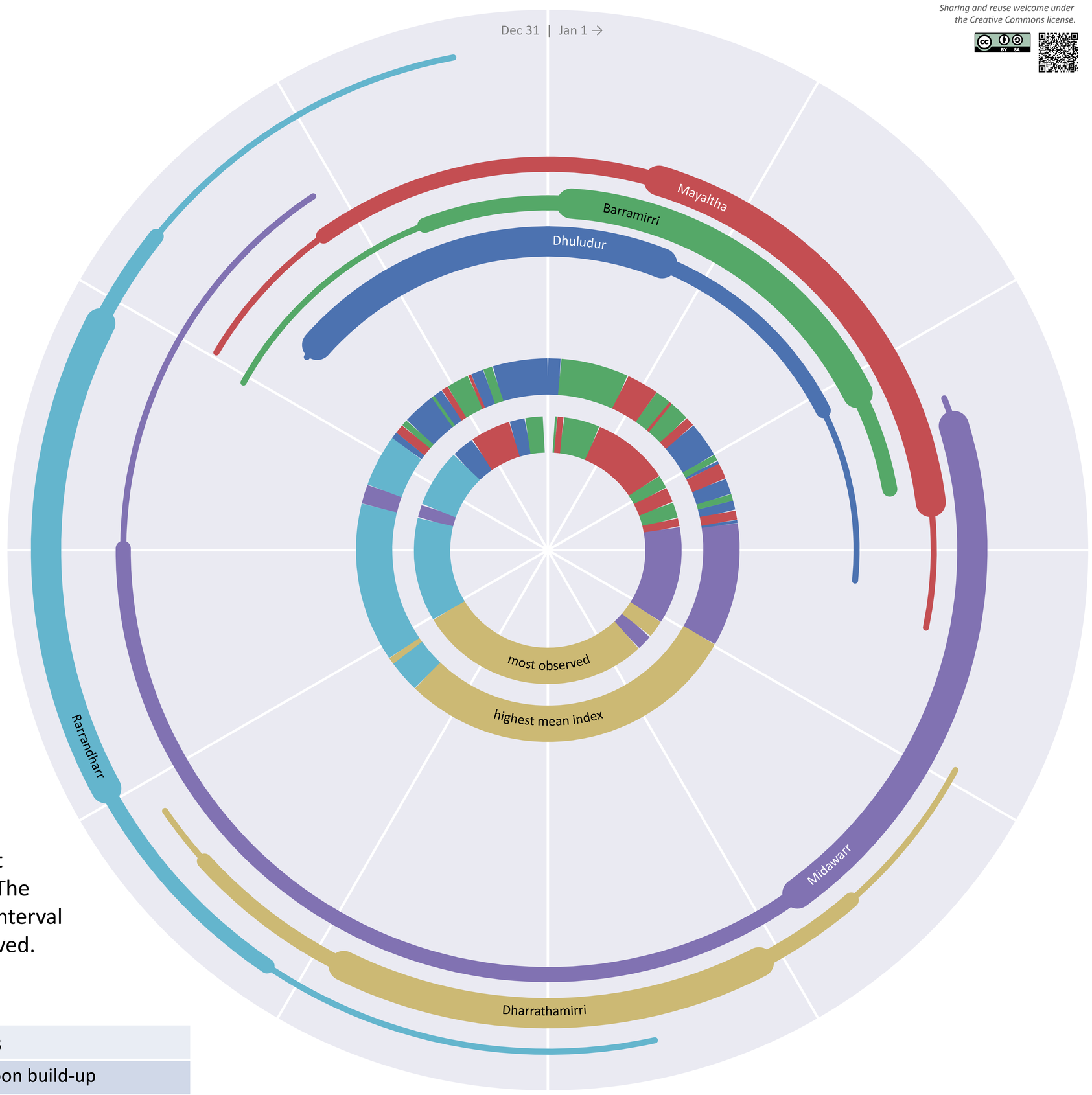
Yolngu seasons are based on weather

Scientists use seasons called DJF, MAM, JJA, and SON (from the names of the months). Summer, Autumn, Winter, and Spring are officially defined as these months too.

Yolngu seasons are defined by weather, not time of year – so you always know what a season will be like, but not when it will start. Each community has their own definitions, and sometimes even different seasons!

Yolngu seasons start and end whenever the weather matches their definitions – zero or more times each year – and do not always occur in the same order, despite the normal progression given in the table below.



Reading this calendar →

This figure shows the typical timing and variability in three ways. The full circles show the season with most observations (inner) and highest mean index (outer). The arcs for each season show (thick to thin) the shortest interval that spans half, 75%, and 90% of the days it was observed.

Season	Definition	Notes
Dhuludur	Cool nights, mixed wind, first rain	Monsoon build-up
Barramirri	NW wind, heavy rain most days	Monsoon break
Mayaltha	NW wind, rain about weekly	Rainy season
Midawarr	NE to E wind, less rain, last storm	Sometimes part of *Mayaltha*
Dharrathamirri	No rain, consistent ESE-SSE wind	Cool, windy dry season
Rarrandharr	Hot days, low humidity	Very hot dry season

Traditional Knowledge, Novel Science

Previous research on Indigenous seasons focuses on ecological and social descriptions, but only describes approximate timing as if they were defined by months. This study of timing and variability therefore makes a distinctive and novel contribution.

Weather-based definitions of seasons have many applications. Better understanding of Indigenous knowledge is key to being a truly Australian society, along with an appreciation of our highly variable climate. Changing seasonal patterns also illustrate climate change more vividly than bare average-temperature numbers.

Selected References:
Australian Bureau of Meteorology (2016), *Indigenous weather knowledge*, http://www.bom.gov.au/iwk
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Methods

Listen,

I sat down with Yolngu and non-Indigenous people who know this calendar, and they told me about its structure and how to recognize each season.

Most books describe the seasons, but not the structure of the calendar. Does talking about ‘typical timing’ even make sense?

Analyse,

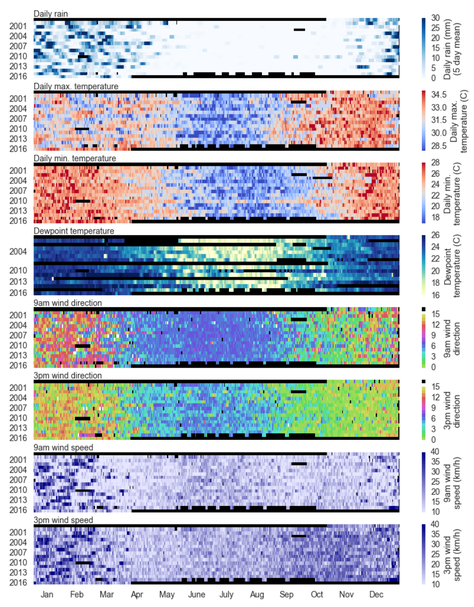
Next, I tried to work out a quantitative definition for each season – based on weather observations from the Bureau of Meteorology.

What temperature is ‘cool’? I experimented, and now use percentiles which lead to sensible patterns of the seasons – this data is inherently subjective.

Describe.

Finally, I calculated a daily index for each season. Comparing and averaging the indices provide different ways to think about when seasons usually occur.

Which to use depends on why you want to know – means for typical weather (below), or spanning period for variability (above)



Data Analysis

Weather observations for eight variables (left) are used to derive an index for each season.

For each day, the season with the greatest normalized index occurred.

Mean index (right lines) and most frequent occurrence (right solid) are both reasonable ways to describe the ‘typical season’ – as in the inner rings above!