

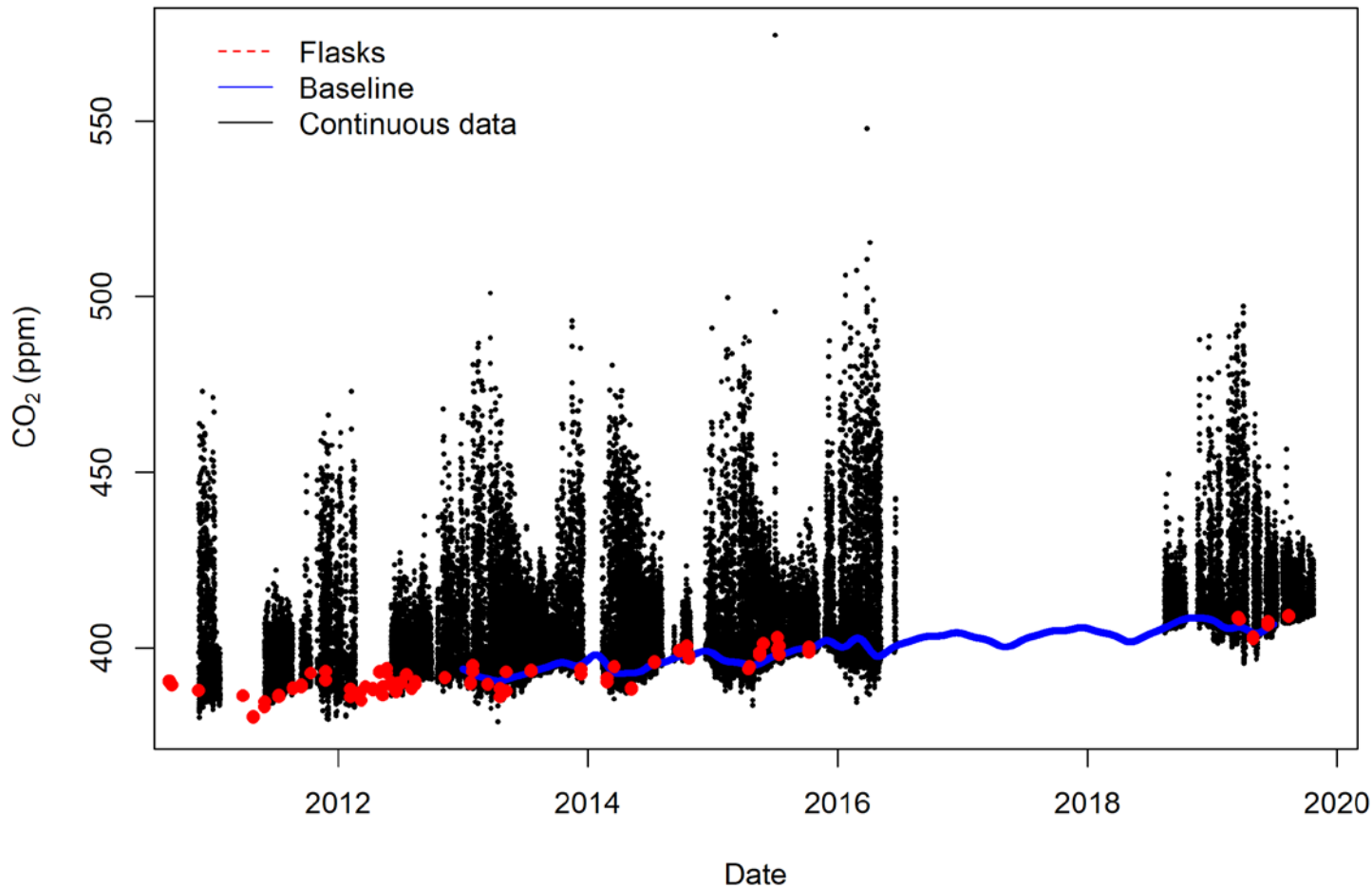
# A new collaboration to monitor atmospheric changes in the tropics

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# Exploring the CO<sub>2</sub> record from NT BAPS

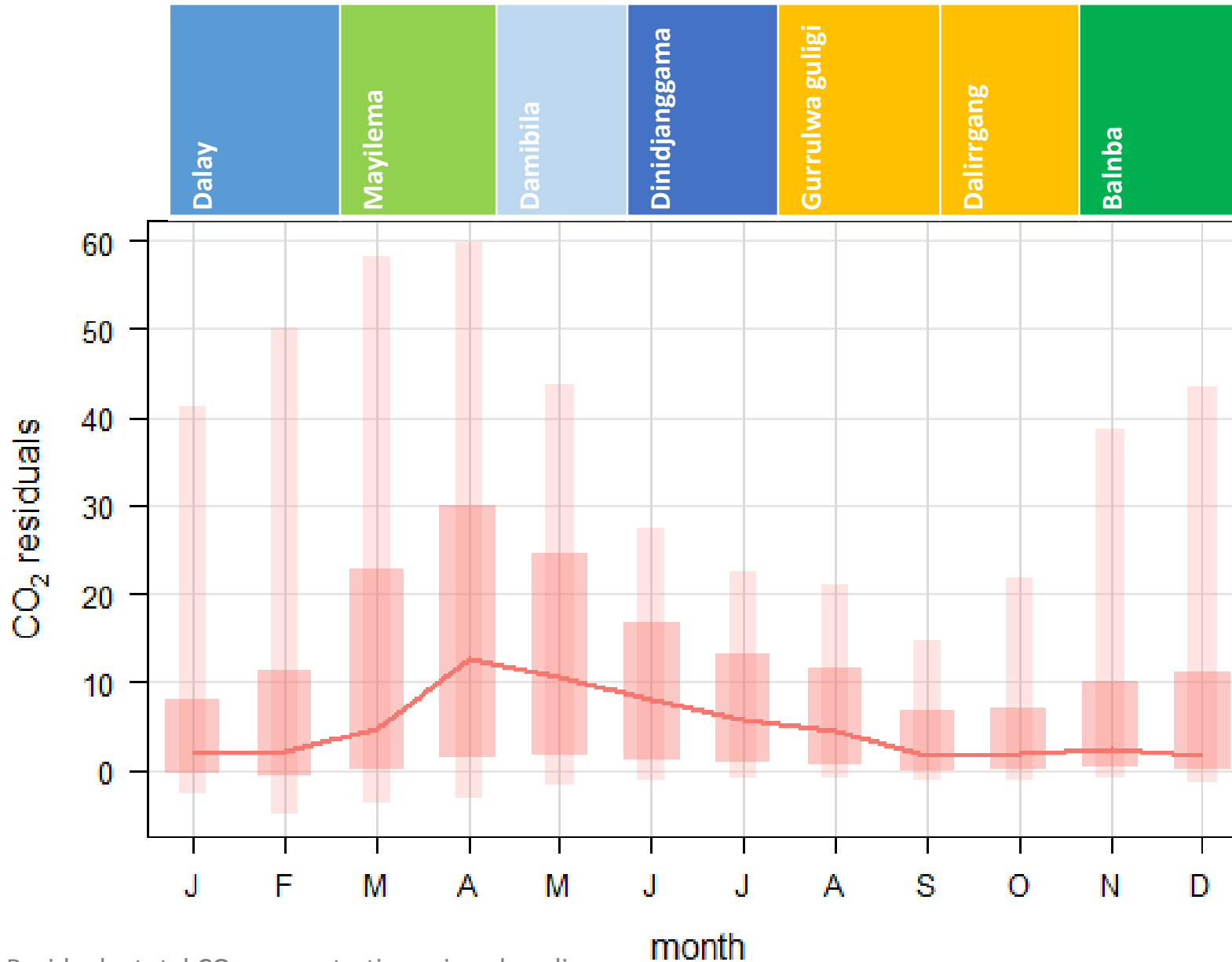


Local influences can be explored by looking at the residual CO<sub>2</sub> levels – the CO<sub>2</sub> concentration with the baseline subtracted

# EXPLORING LOCAL SEASONAL INFLUENCES



Source: Williams et al (2012)



Residual = total CO<sub>2</sub> concentration minus baseline

## Dalirrgang, Balnba, Dalay:

- Build-up, rainy season, monsoon
- Median CO<sub>2</sub> concentrations close to baseline (residual ~ 0)
- West – north westerly winds are bringing cleaner marine air masses from the ocean

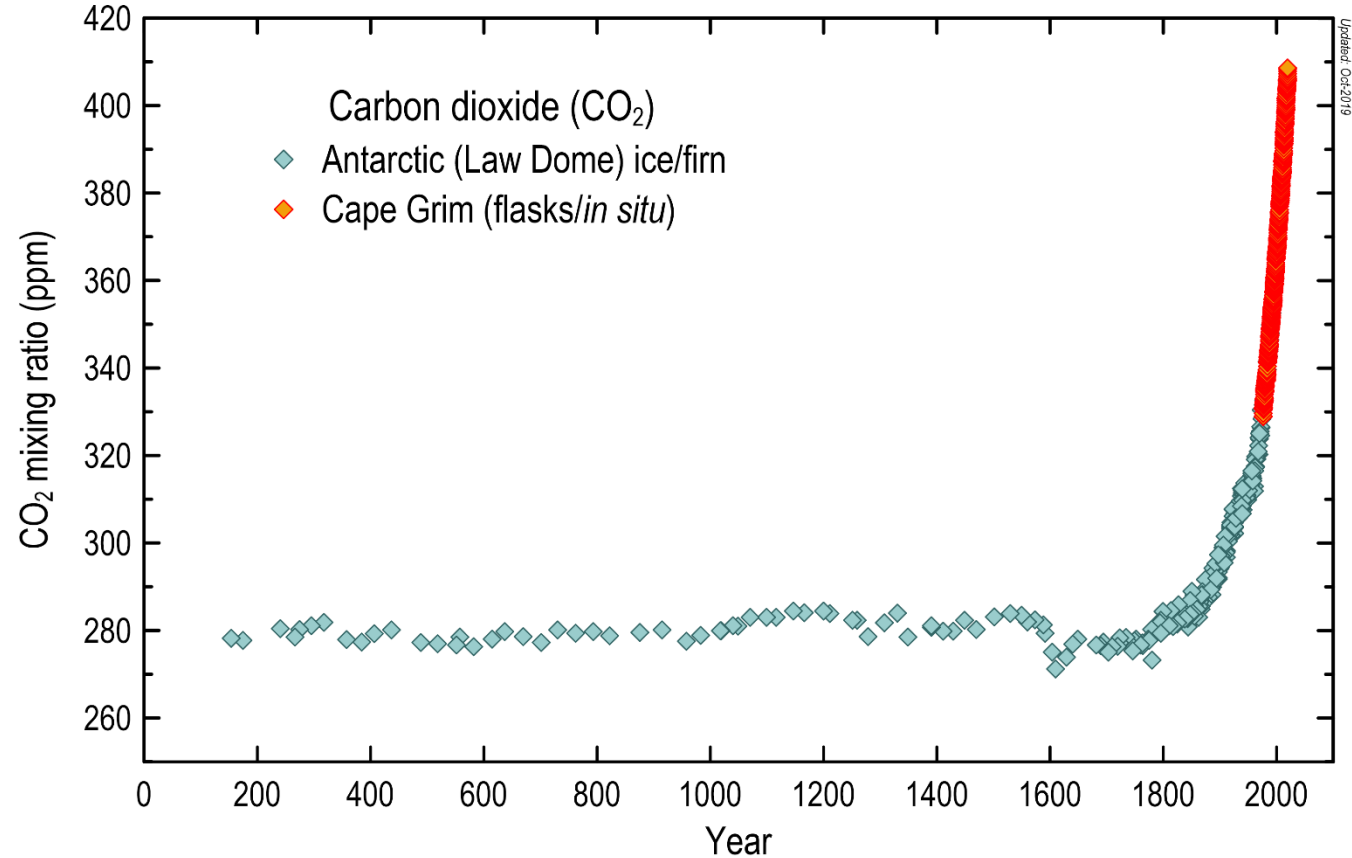
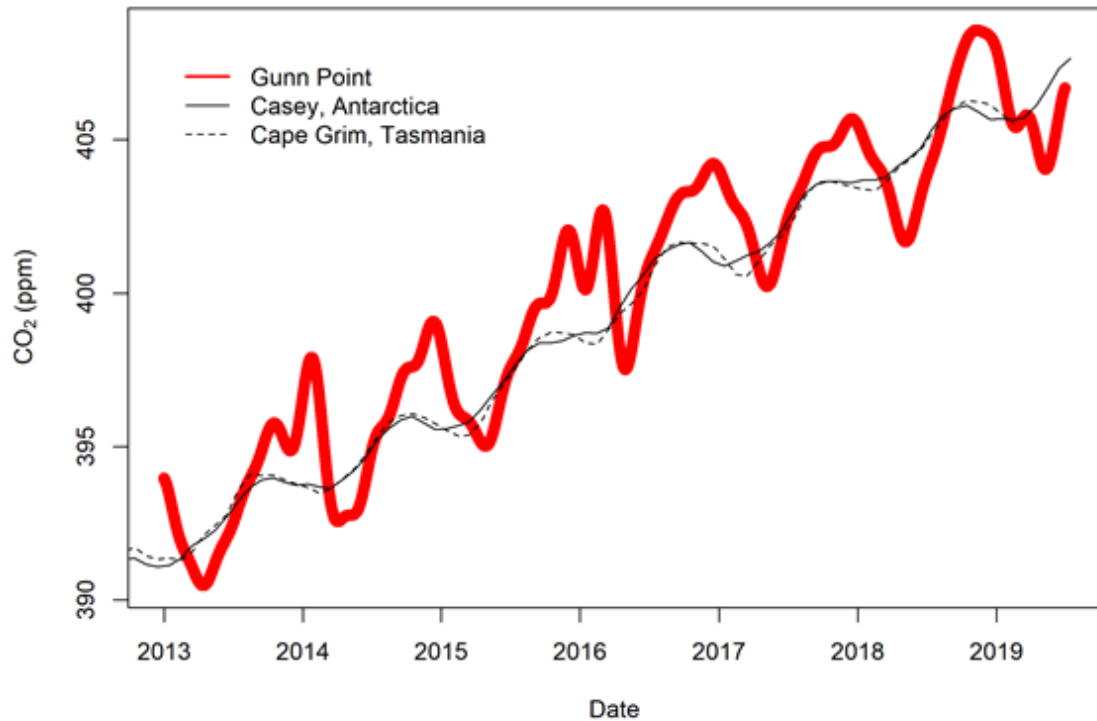
## Mayilema, Damibila, Dinidjanggama, Gurrulwa guligi:

- Dry season, trade winds, burning season
- Median CO<sub>2</sub> residuals peak in April when east - south easterly winds bring air masses from the continent influenced by vegetation, fire, soil

# BASELINE CO<sub>2</sub> AT NT BAPS AND THE LONG TERM RECORD

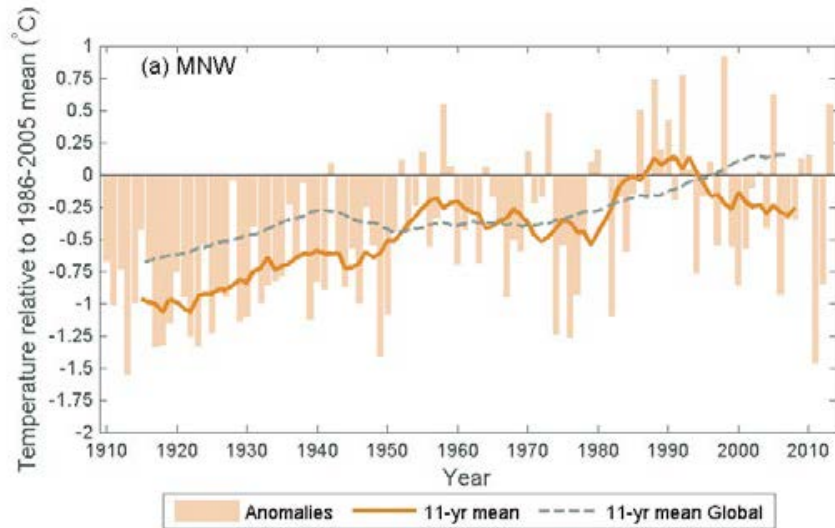
**Recent trends** – an increase of CO<sub>2</sub> of over 12-14 ppm at Gunn Pt since 2013. In line with other sites spanning the Southern Latitudes

**Long-term trends** – an increase of CO<sub>2</sub> from 280 ppm in pre-industrial times to over 400 ppm presently.



# MONITORING EMISSIONS IN A CHANGING CLIMATE

- TEMPERATURES IN THE MONSOONAL NORTH EAST INCLUDING THE DARWIN REGION HAVE INCREASED  $\sim 0.9^{\circ}\text{C}$  IN THE PERIOD 1910 – 2013



- Under a moderate emission scenario (RCP 4.5) temperatures in Northern Australia are projected to Continue to increase
- E.G. For Darwin, days above 35 degrees is predicted to increase from around 11 per year in the current climate to  $\sim 43$  by 2030, and to  $\sim 265$  days by 2090.
- Fewer but possibly more intense cyclones and intense rainfall events are predicted
- Increasing rises in sea level, sea surface temperature and ocean acidity are also forecast

Source: Moise et al (2015)

**THROUGH THIS PROJECT AND OUR MANY OTHER LAND & SEA MANAGEMENT PROJECTS IN SHOAL BAY AND THE GREATER DARWIN REGION, LARRAKIA RANGERS ARE PLAYING A KEY ROLE IN OBSERVING AND MANAGING CHANGES IN OUR LAND AND SEAS, AND CONTRIBUTING TO GLOBAL CLIMATE SCIENCE.**

# REFERENCES

## **Gulumoerrigin Calendar:**

Lorraine Williams, Judith Williams, Maureen Ogden, Keith Risk, Anne Risk and Emma Woodward. 2012. *Gulumoerrigin Seasons (calendar)*: Larrakia, Darwin - Northern Territory. CSIRO Ecosystem Sciences, Darwin, NT.

Available: <https://www.csiro.au/en/Research/Environment/Land-management/Indigenous/Indigenous-calendars>

## **Climate projections:**

Moise, A. *et al.* 2015, *Monsoonal North Cluster Report*, *Climate Change in Australia Projections for Australia's Natural Resource Management Regions: Cluster Reports*, eds. Ekström, M. *et al.*, CSIRO and Bureau of Meteorology, Australia.