

Quantifying optimal flight conditions of *Megachile rotundata*

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Introduction

The flight abilities of *M. rotundata* are of importance to survival and reproduction. Offspring emerge from brood cells made from cut leaf pieces that are gathered by females while providing parental care. Decreased flight can reduce time spent providing parental care, resulting in fewer offspring¹. Environmental factors, such as temperature, may prohibit flight². However, the threshold defining when *M. rotundata* will or will not fly is currently unknown.



Methods

- 20 marked females and 10 males per nesting box
- 144 holes in each nesting box (n=3)
- Weather station, controlled by Arduino, records data every minute
- GoPro cameras record from 7AM-11AM daily
- Data collected three times per week



Hypothesis

Environmental conditions affect first flight of *M. rotundata*.

Discussion

- Findings prove that hypothesis is supported, and environmental conditions affect first flight in *M. rotundata*.
- Some weather factors are more crucial for flight than others, such as nesting block temperature.
- More research is necessary to determine the interaction of factors on first flight.

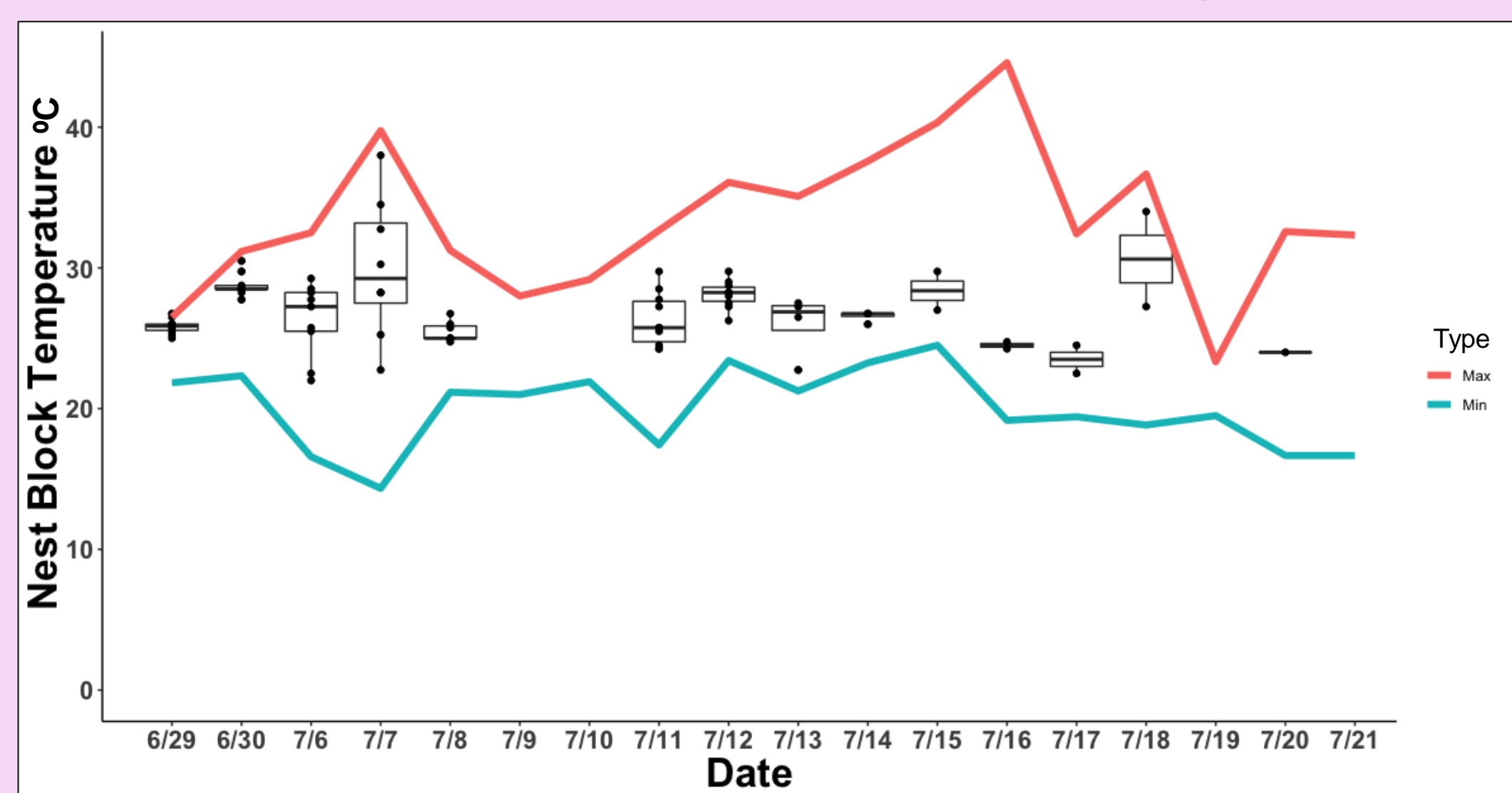
Future Directions

- Research first flight affect when nesting box temperature is manipulated

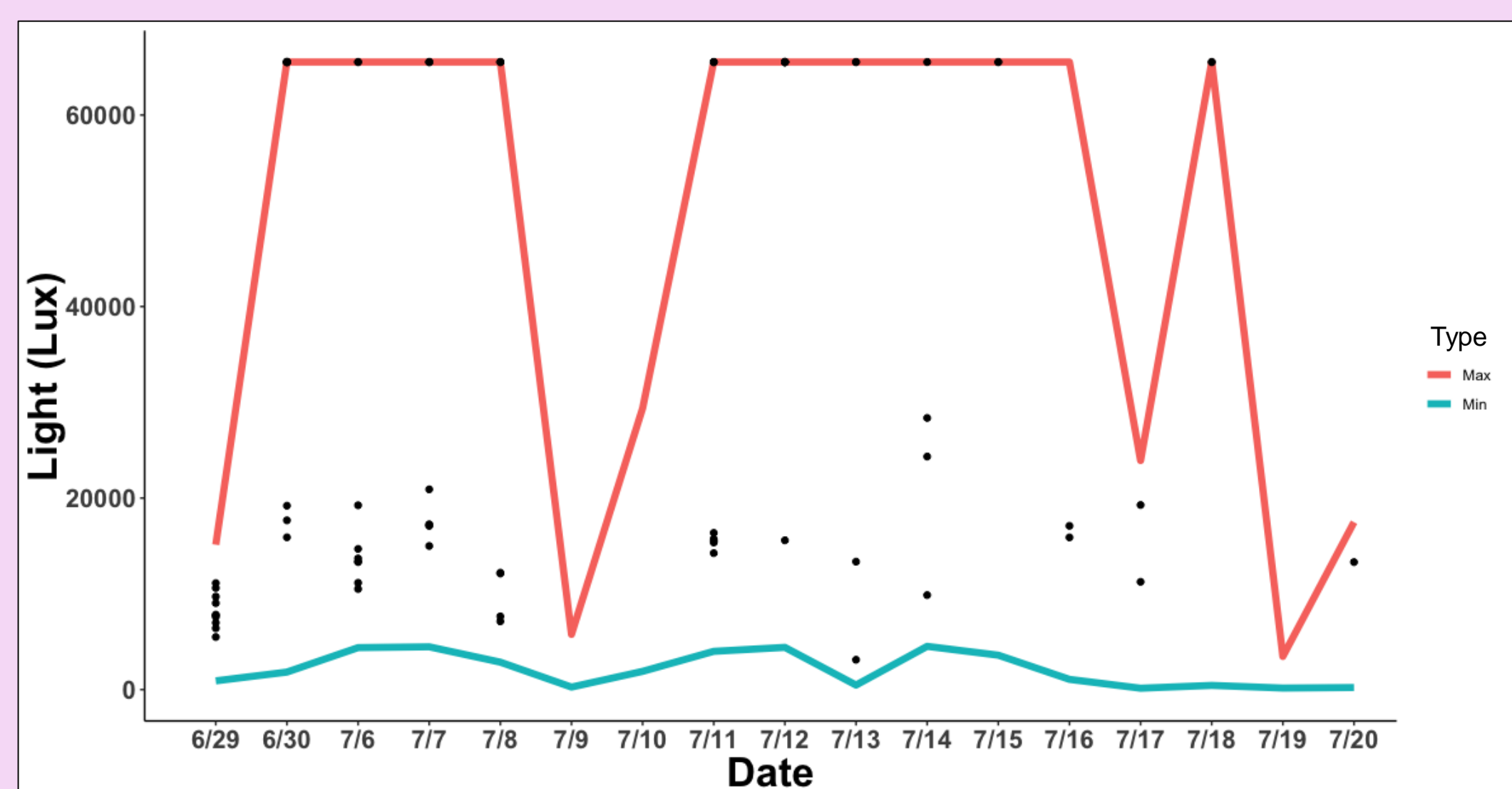
Results

All Days

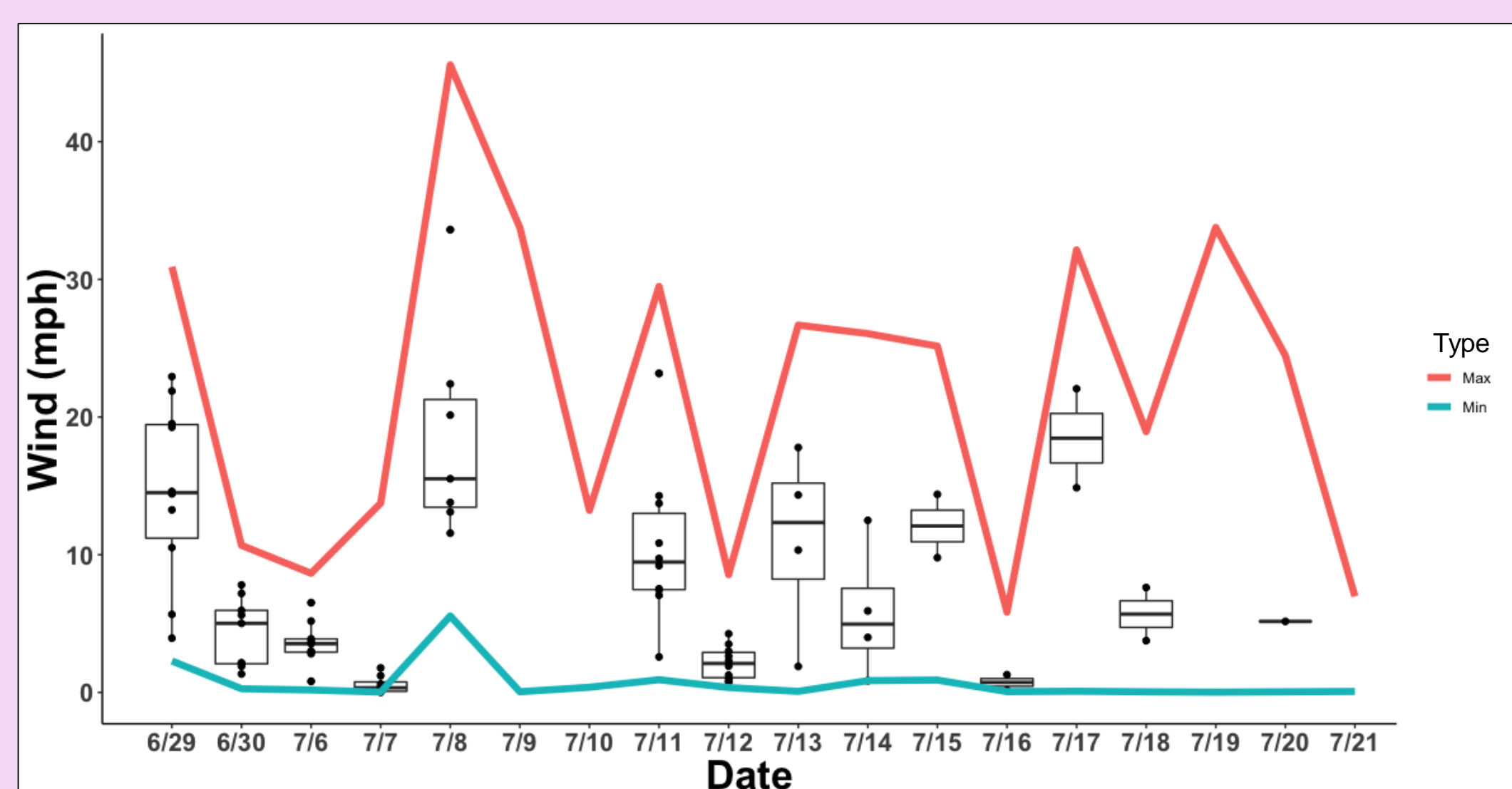
Minimum temperature required for flight is 22°C



Minimum light required for flight is 3116lx

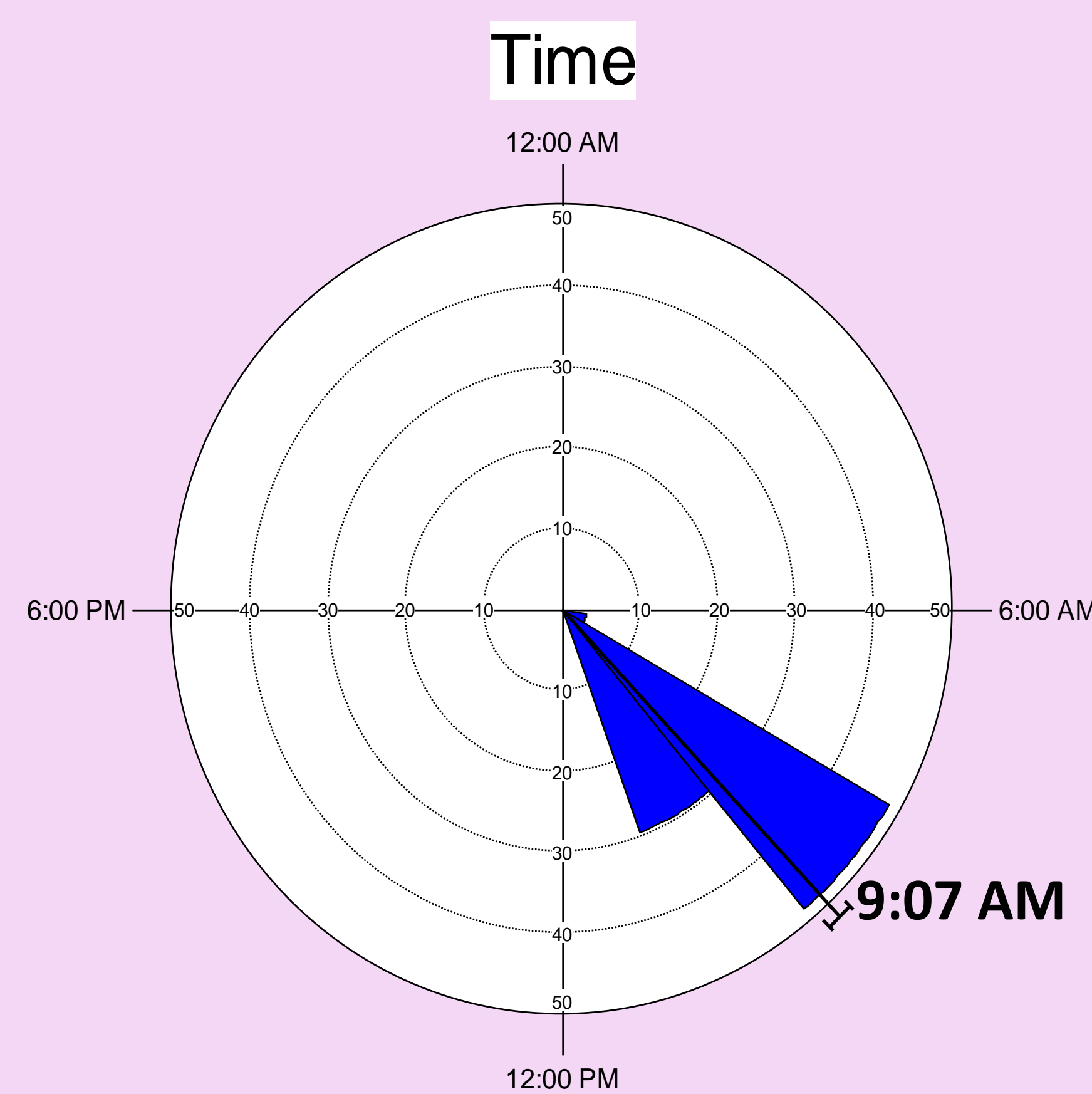


Wind is highly variable and flight occurred at a range of 0.01mph to 33.61mph



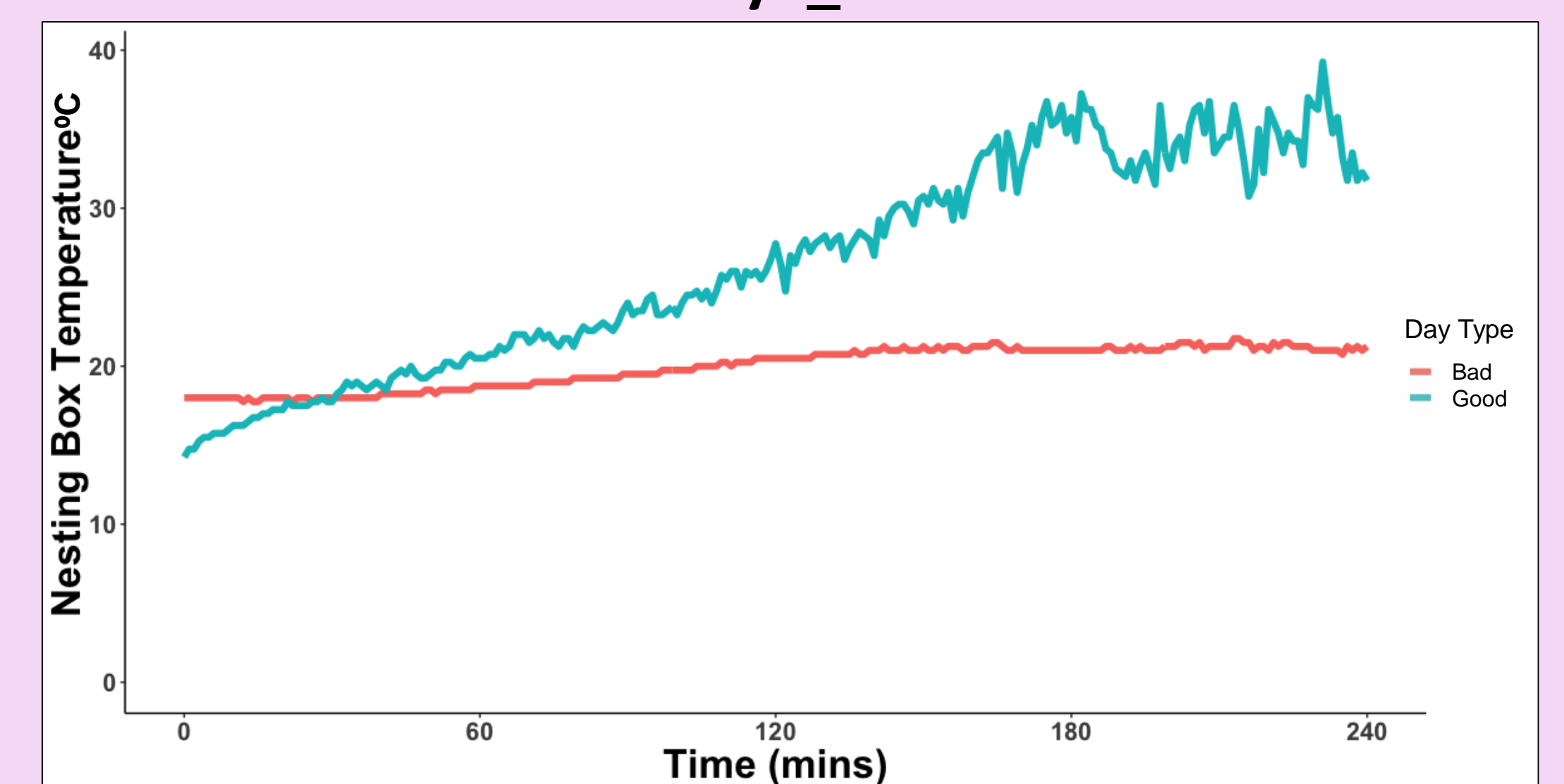
Bees prefer to fly around 9:07 AM.

Rayleigh Test: P<0.0001

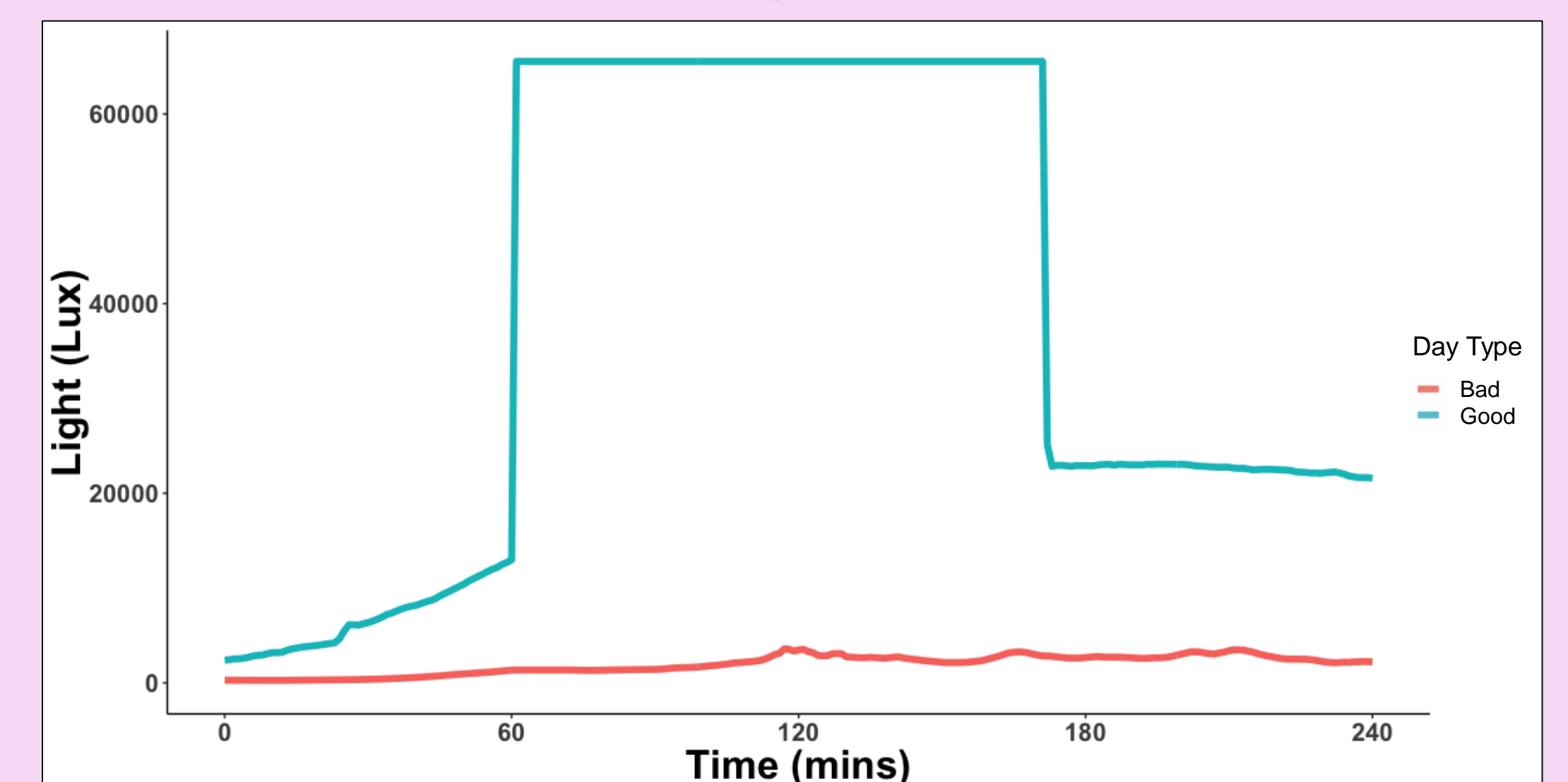


Good vs. Bad Day

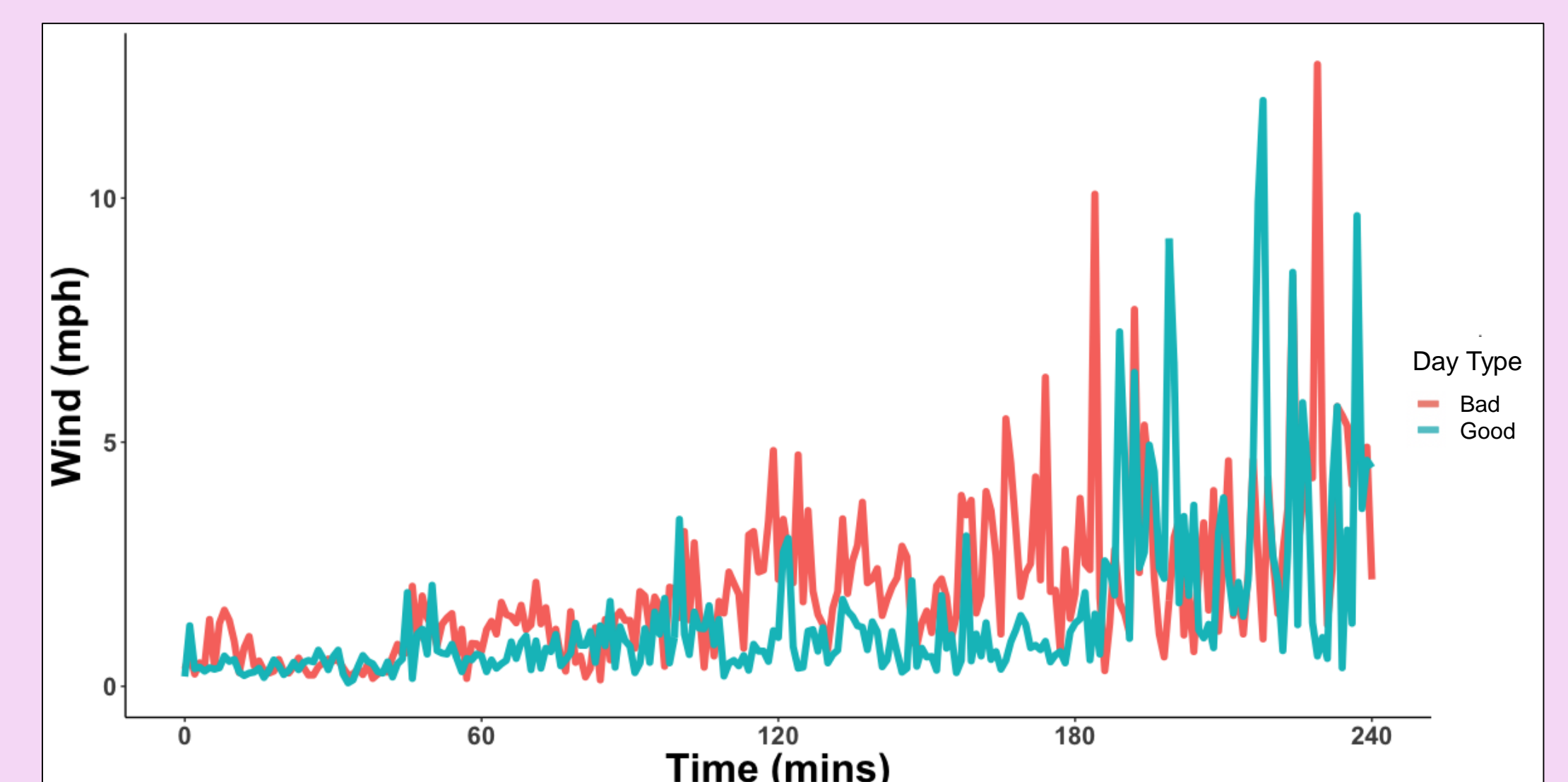
Bad Day: $\leq 21.75^\circ\text{C}$



Bad day: $\leq 3581\text{lx}$



Wind is highly variable on both good and bad days



Citations

- ¹ Roitberg & Peterson (2006) *Behav Ecol Sociobiol*, 59: 589-596
² Taylor (1963) *Journal of Animal Ecology*, 32(1): 99-117

Want to see some bees in action? Scan here! →



Acknowledgements

I would like to thank everyone who supported me to step out of my comfort zone and participate in this program. Additionally, I would like to thank all of the REU students and mentors who helped me with this project and for allowing me to share such important research.