Experimental Design Considerations for Determining Bleaching Thresholds

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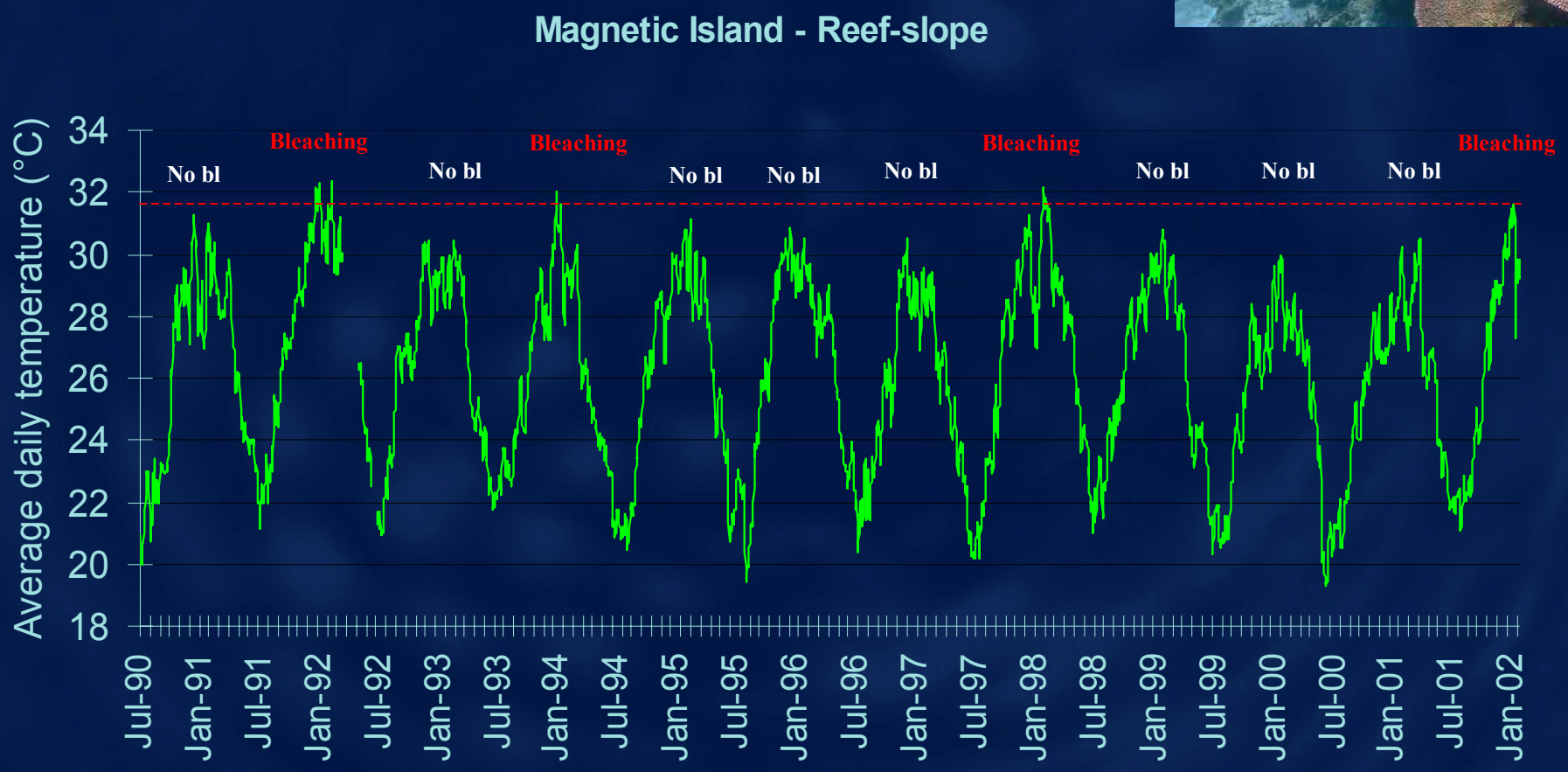
Representing bleaching thresholds – How important is temperature?



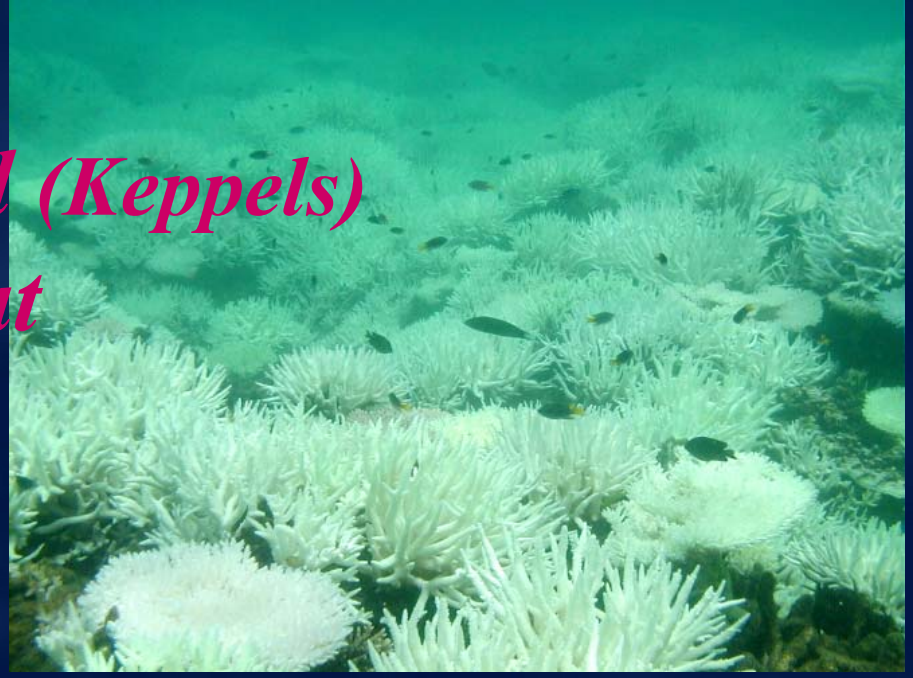
Miall Island

Halfway Island

eat Keppel Island

Lorne Reef

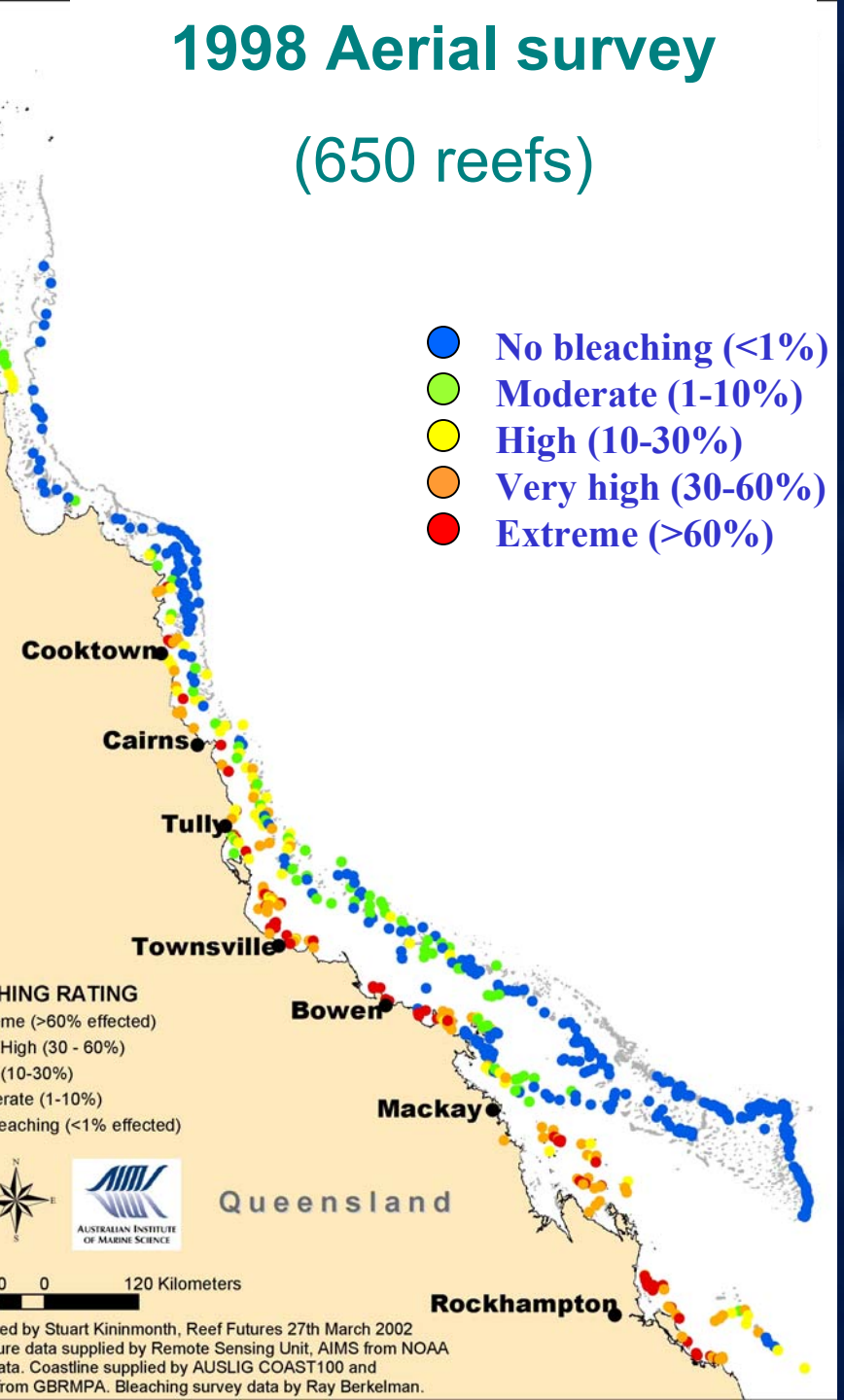
Halfway Island (Keppels) reef flat



North Keppel Island

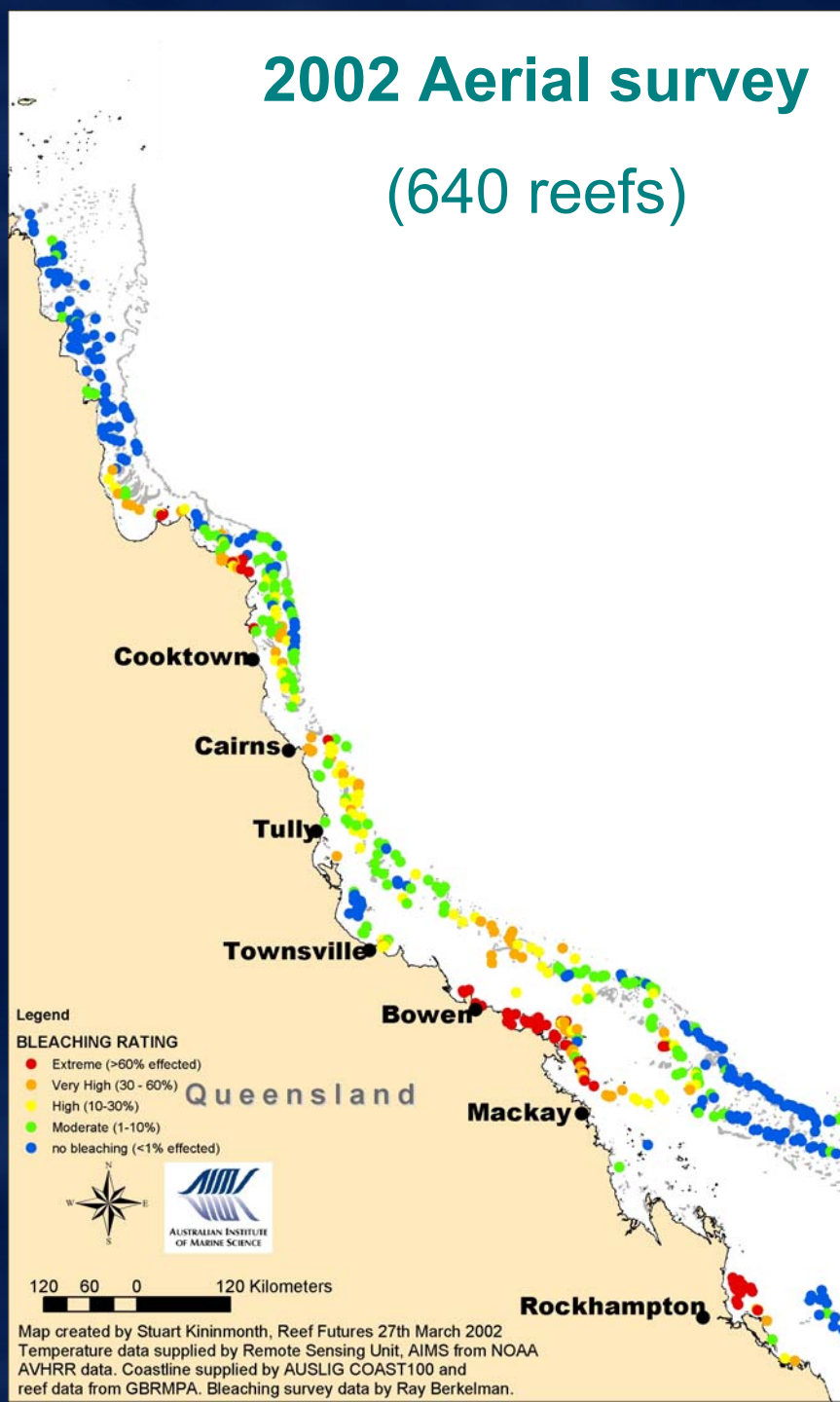
1998 Aerial survey

(650 reefs)



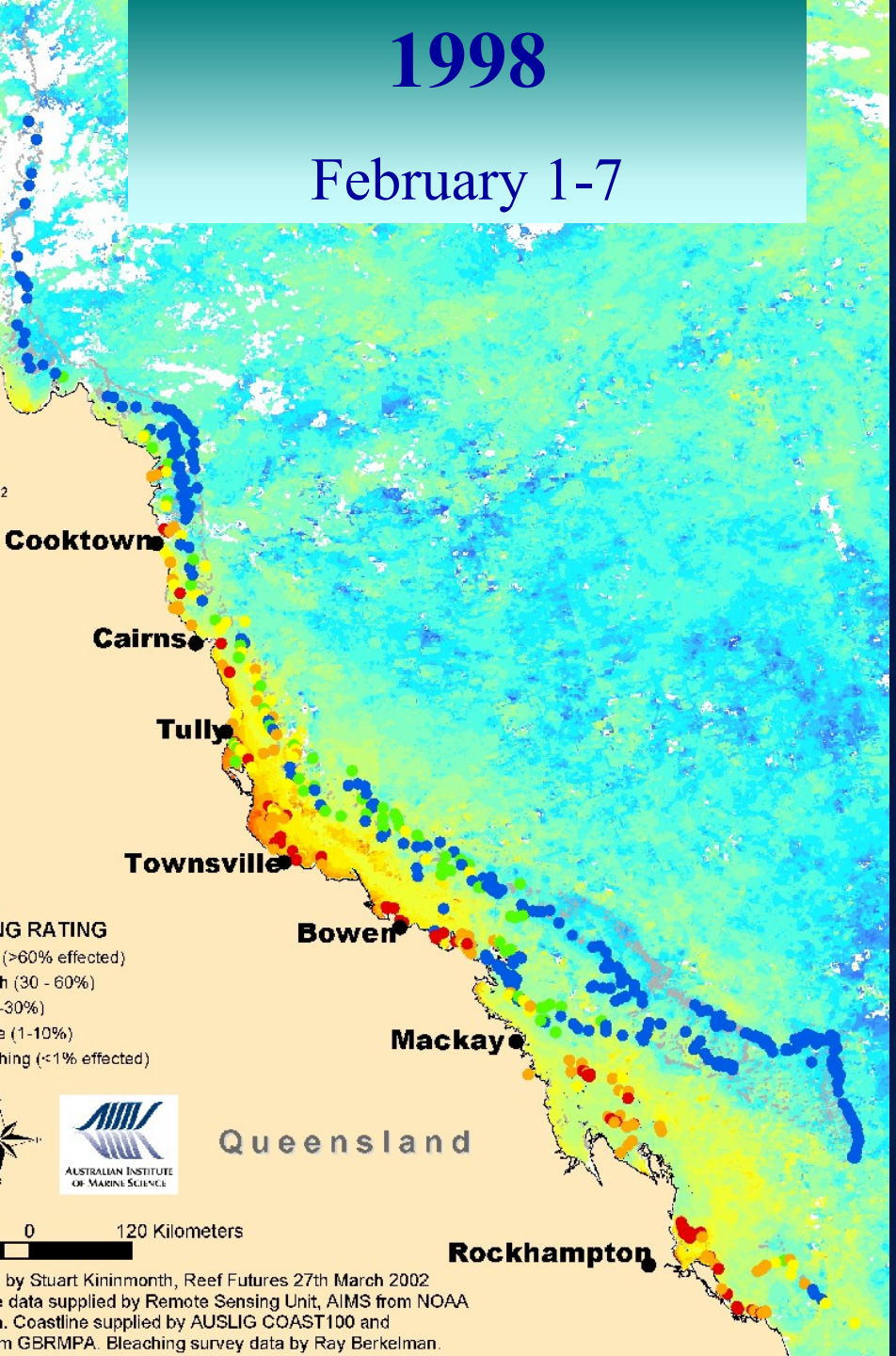
2002 Aerial survey

(640 reefs)



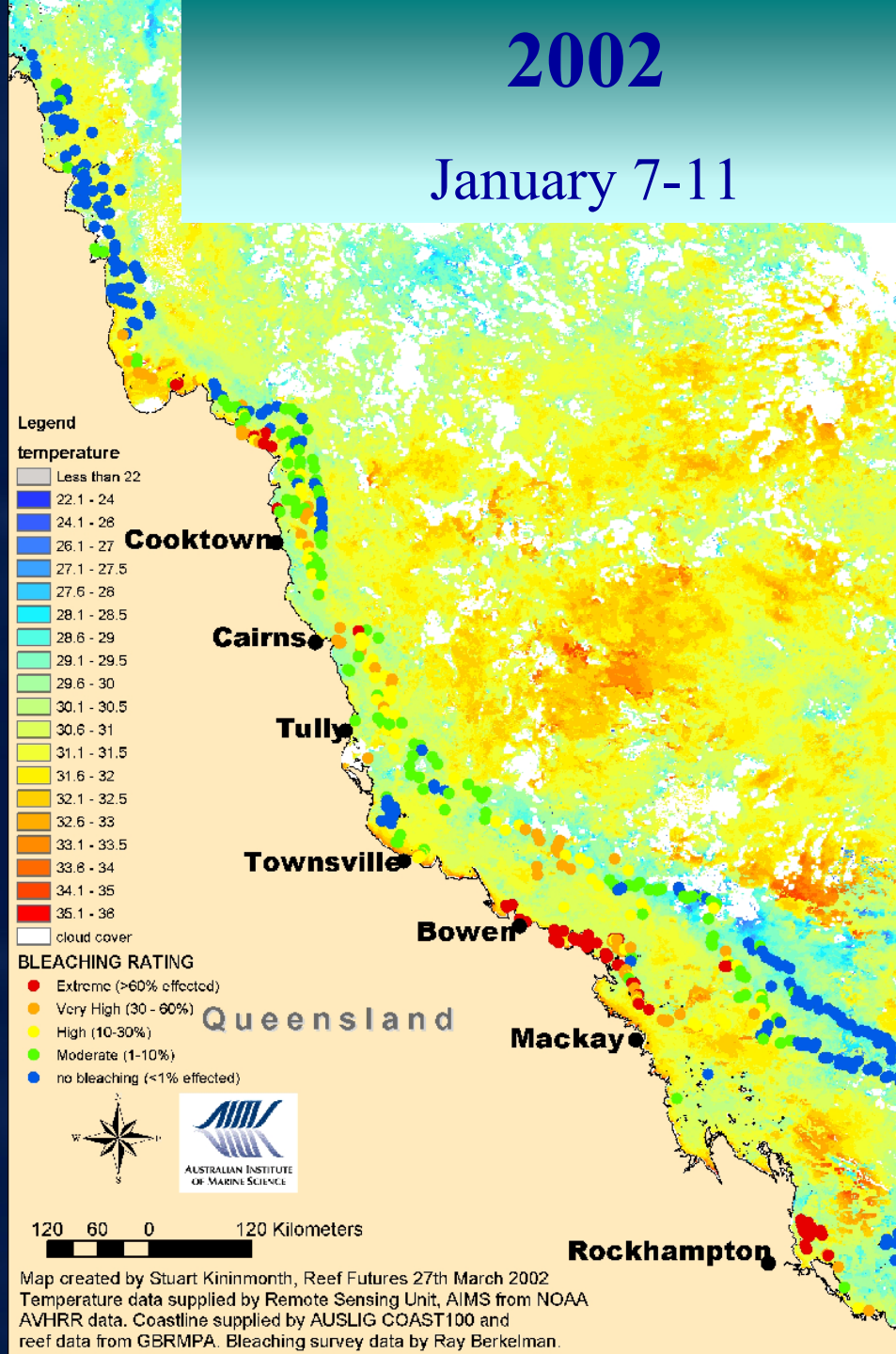
1998

February 1-7

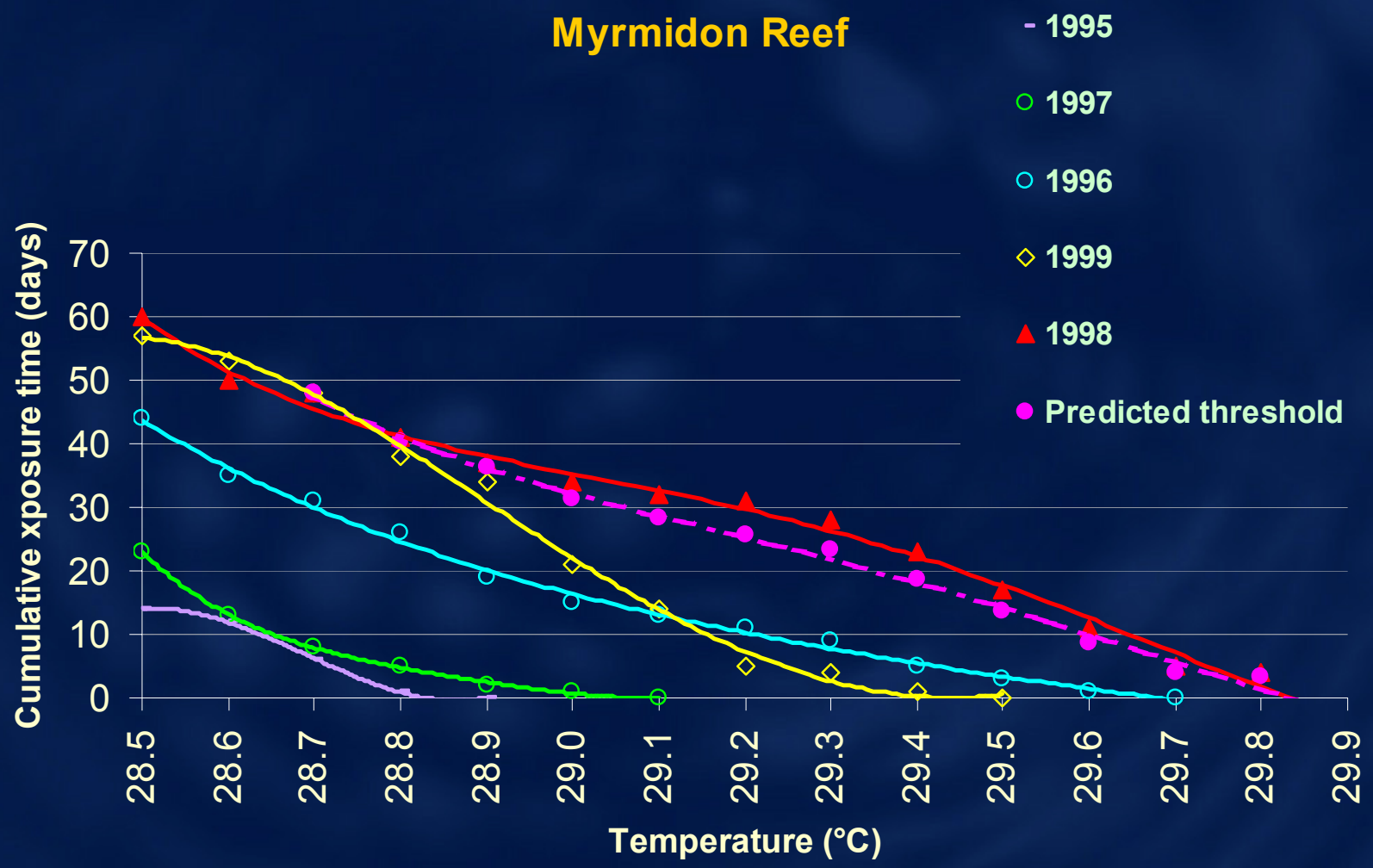


2002

January 7-11

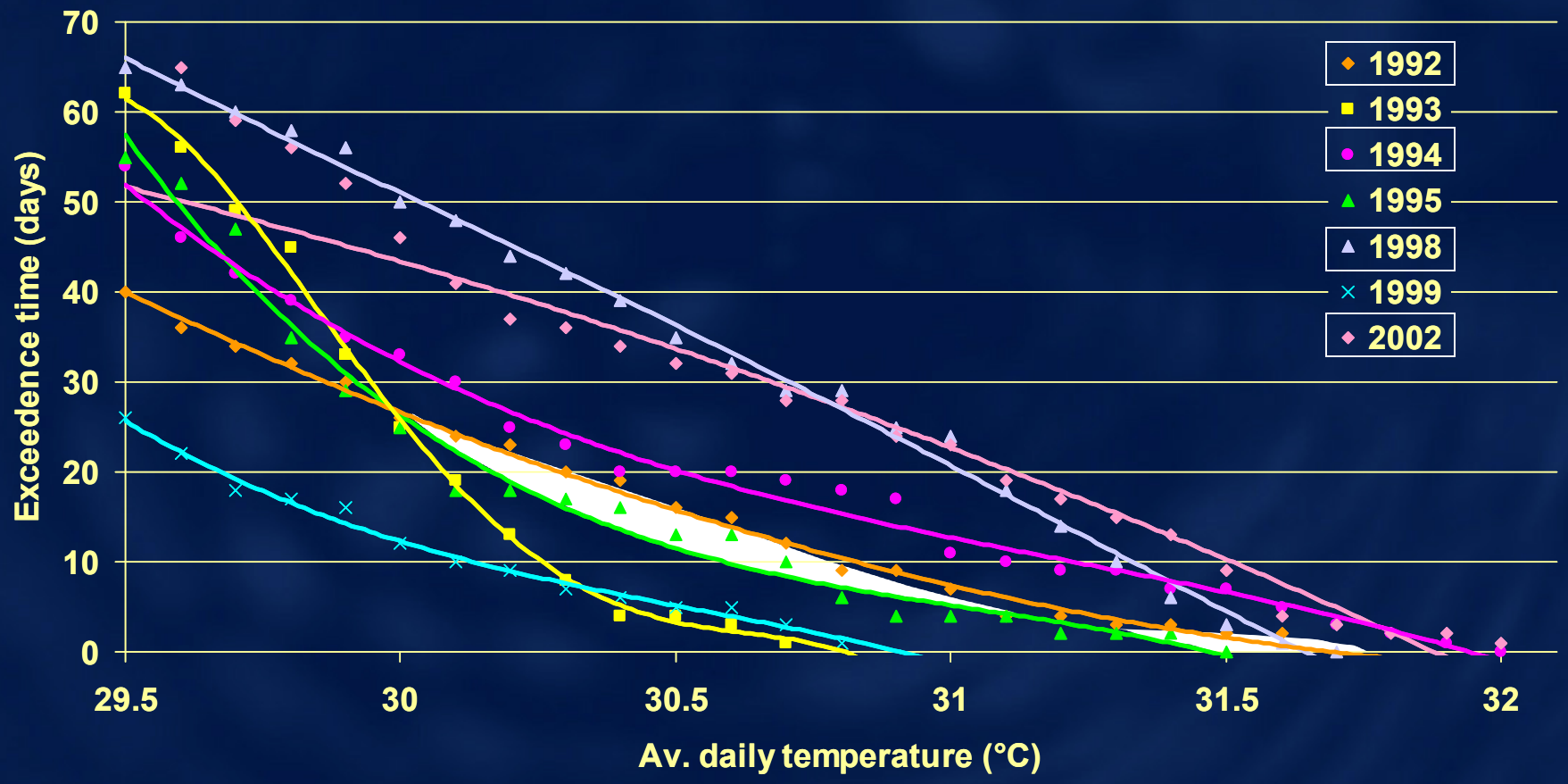


Time-integrated bleaching thresholds



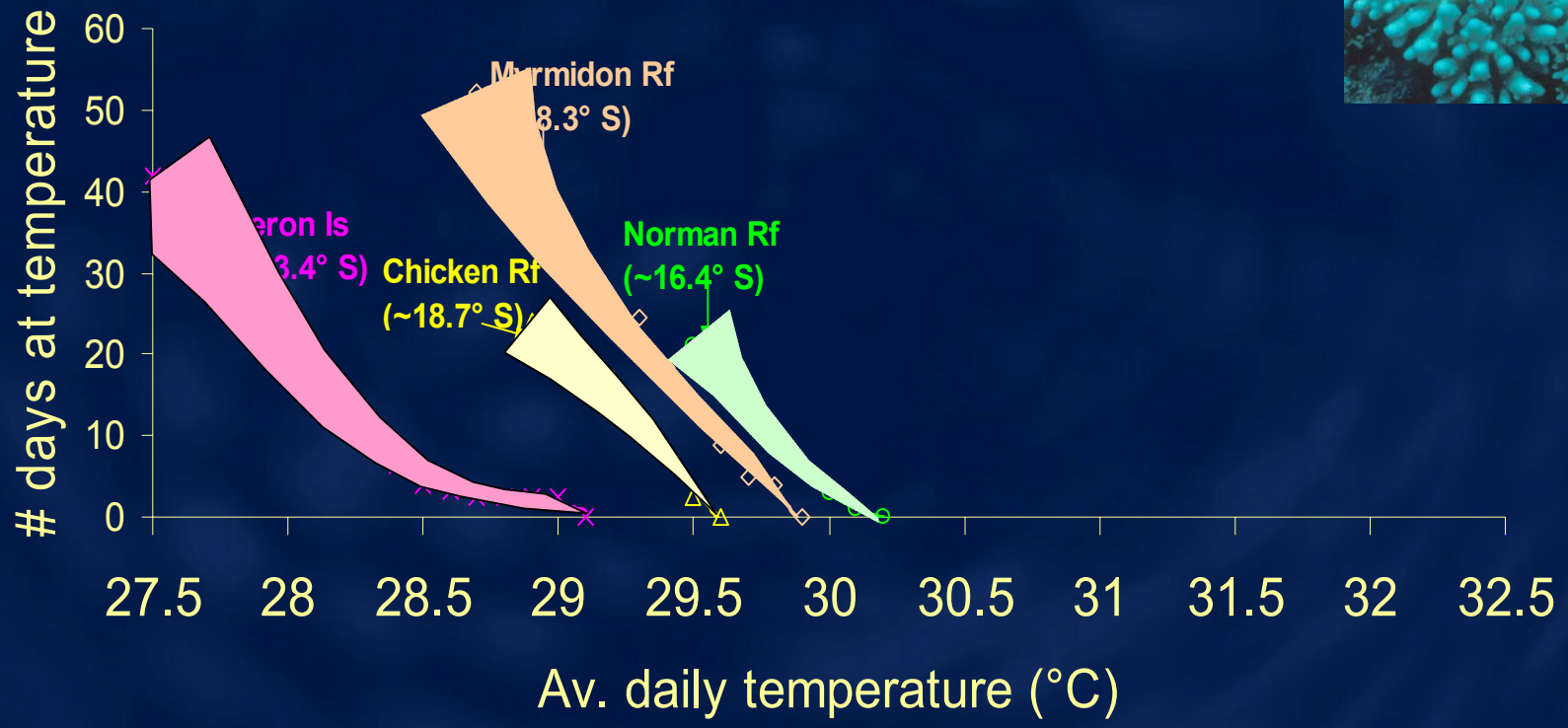
Multiple bleaching events

(Magnetic Island)

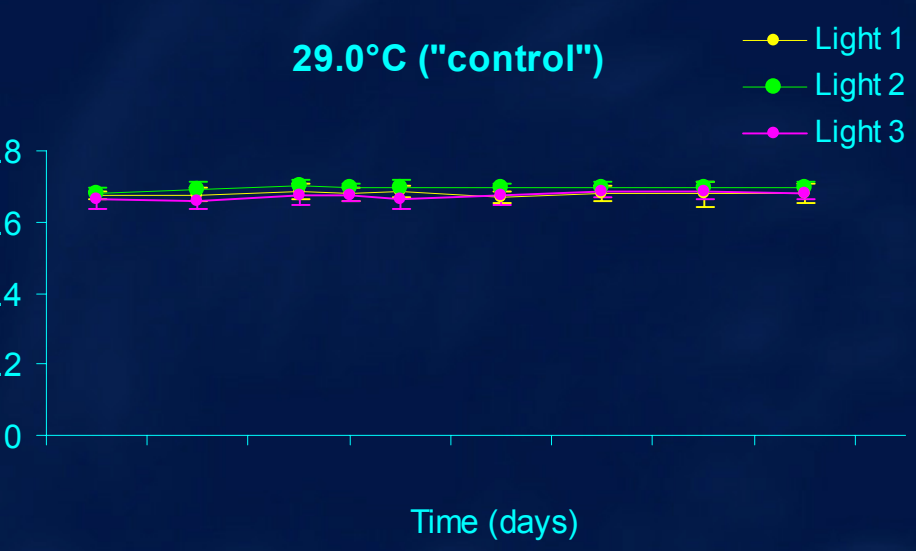


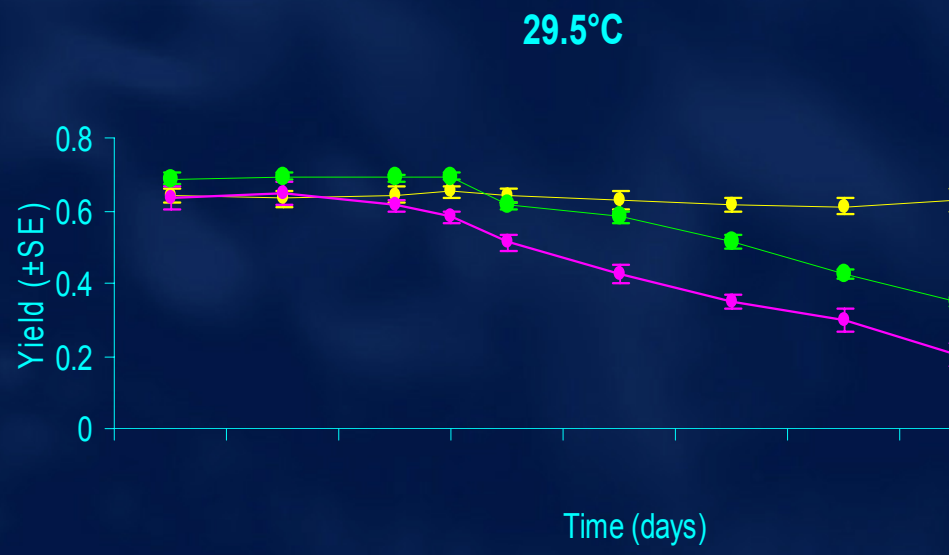
Bleaching thresholds

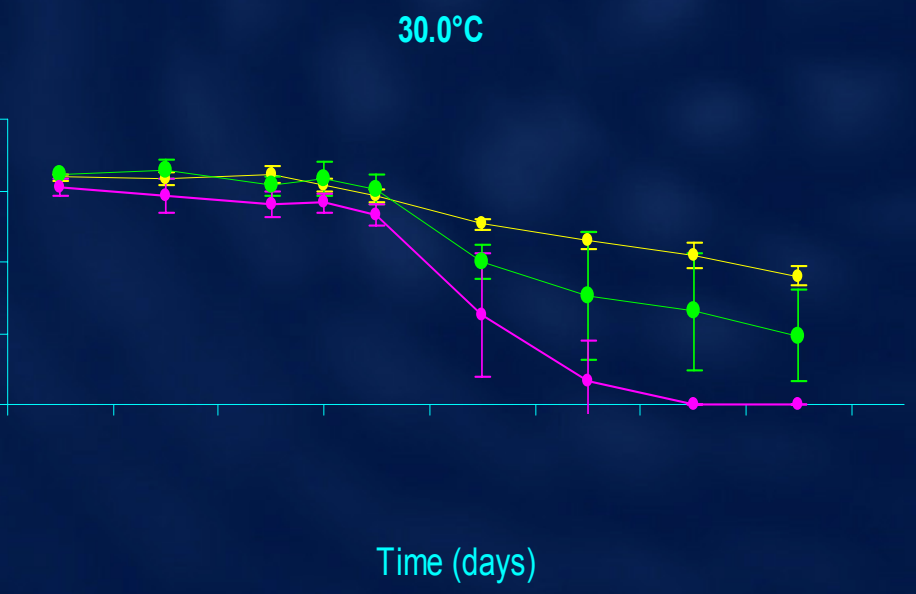
- Species Level
- Time and temperature
- Light

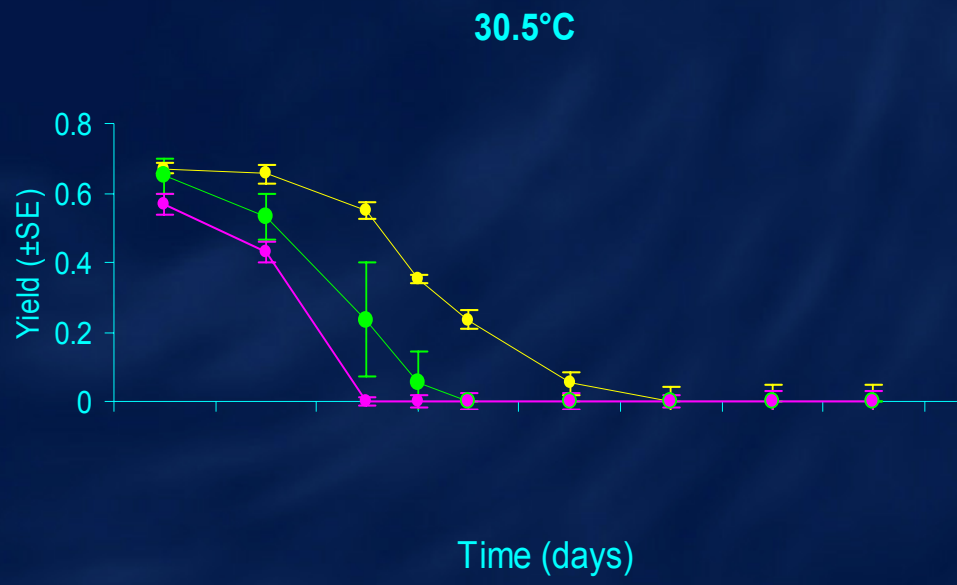


3-Factor threshold experiment – *1 species*

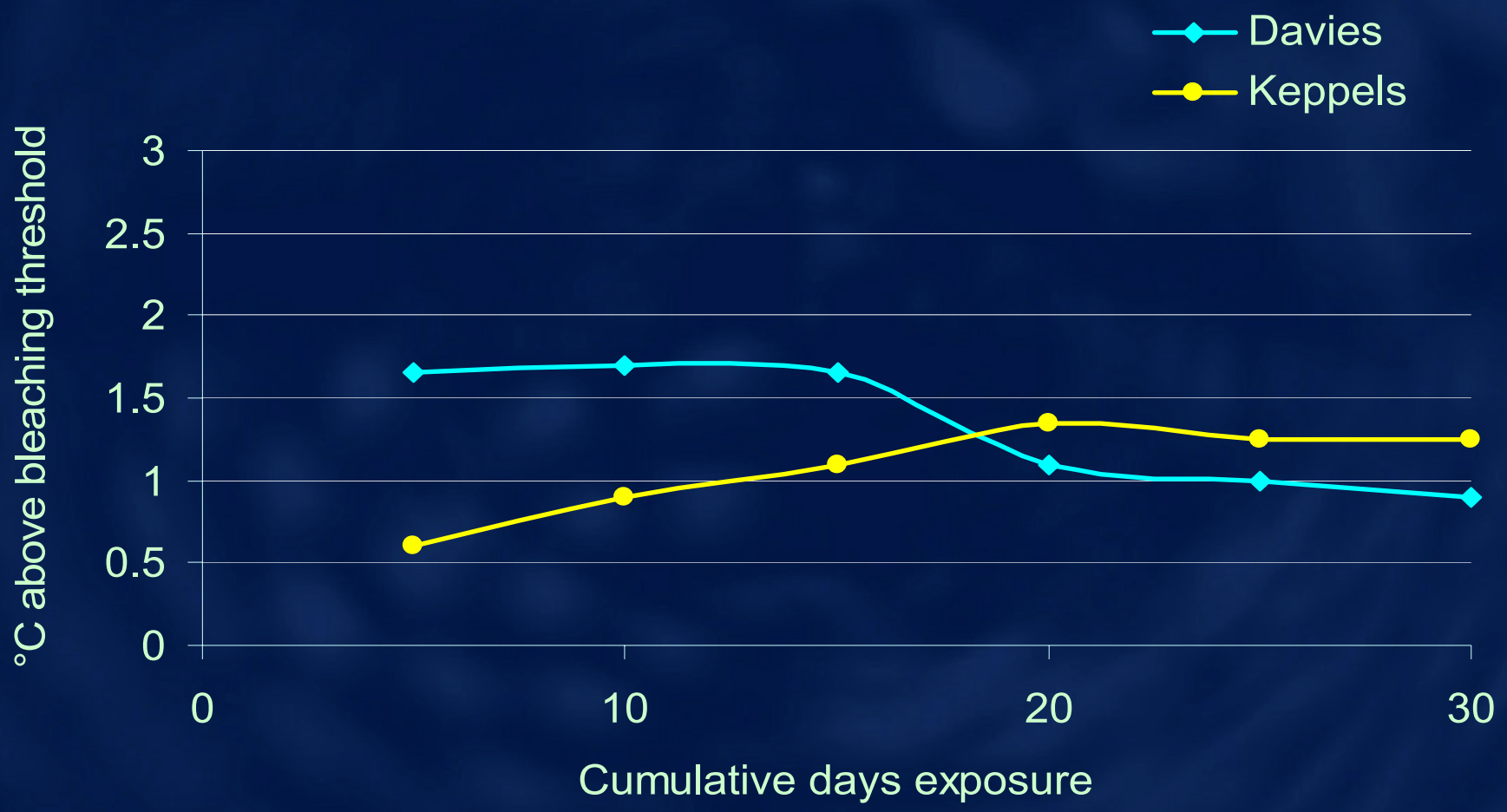




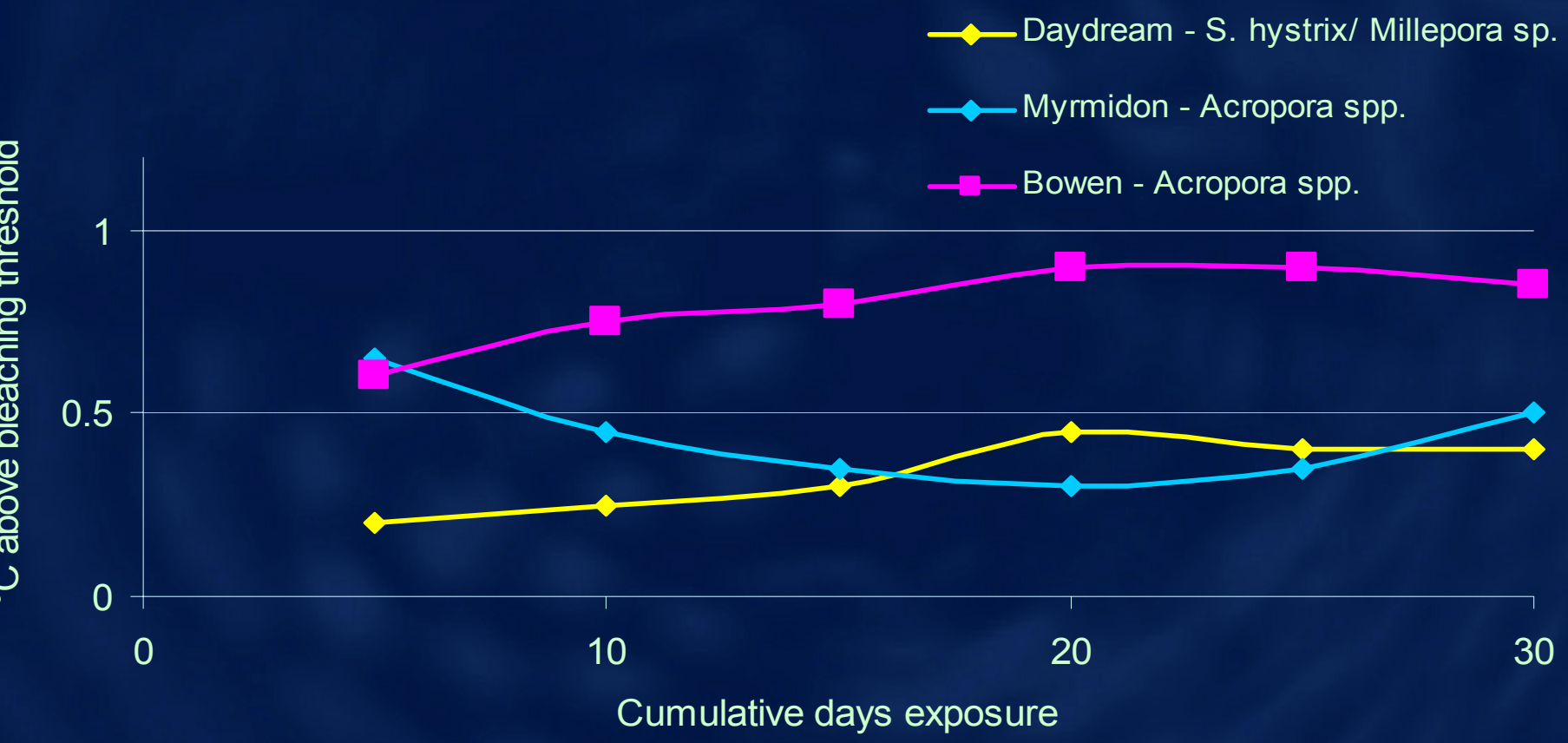




Mortality Thresholds –
Acropora millepora



Mortality thresholds - Field



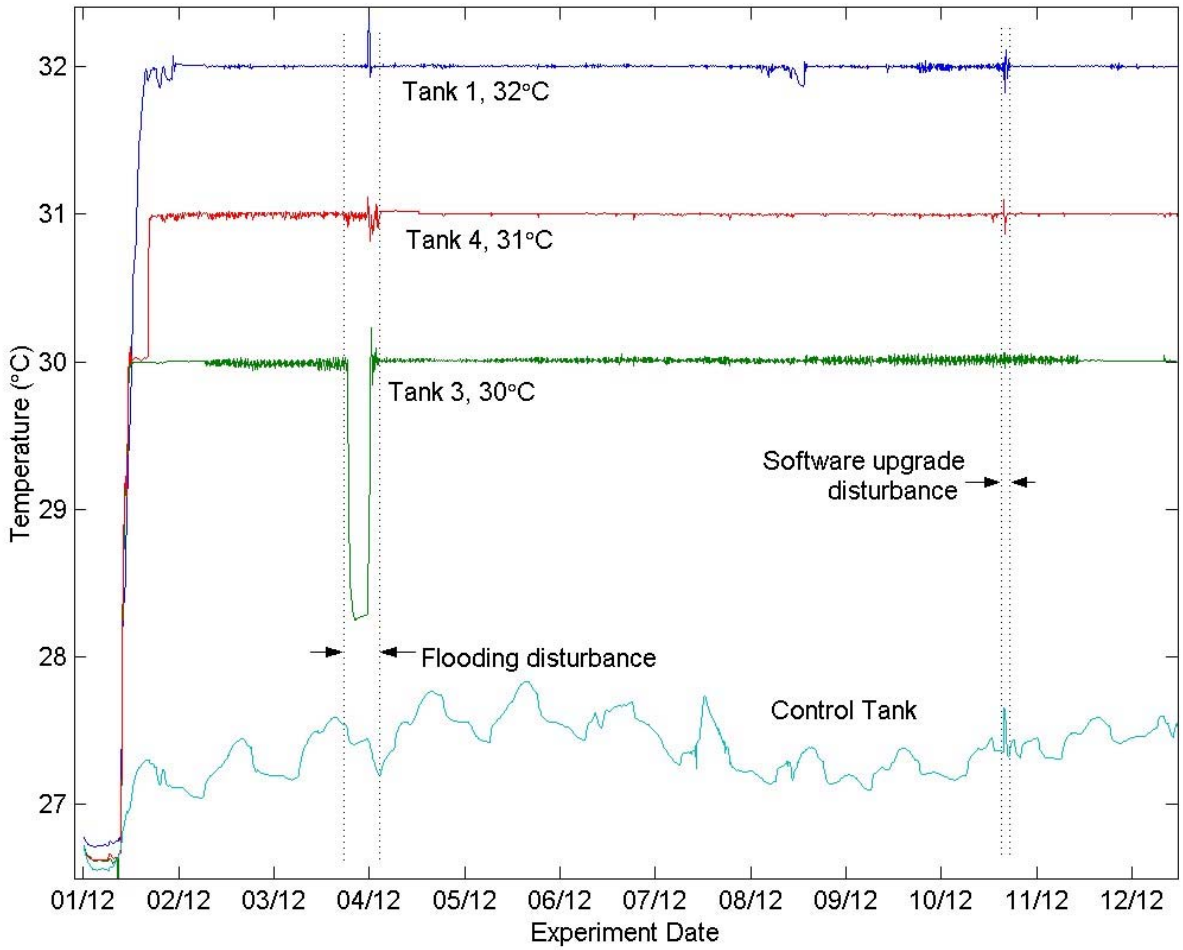
Controlling temperature

- Precisi
Indoors, lar
volume

- logistic
Power, cos

- Heatin
& coolin

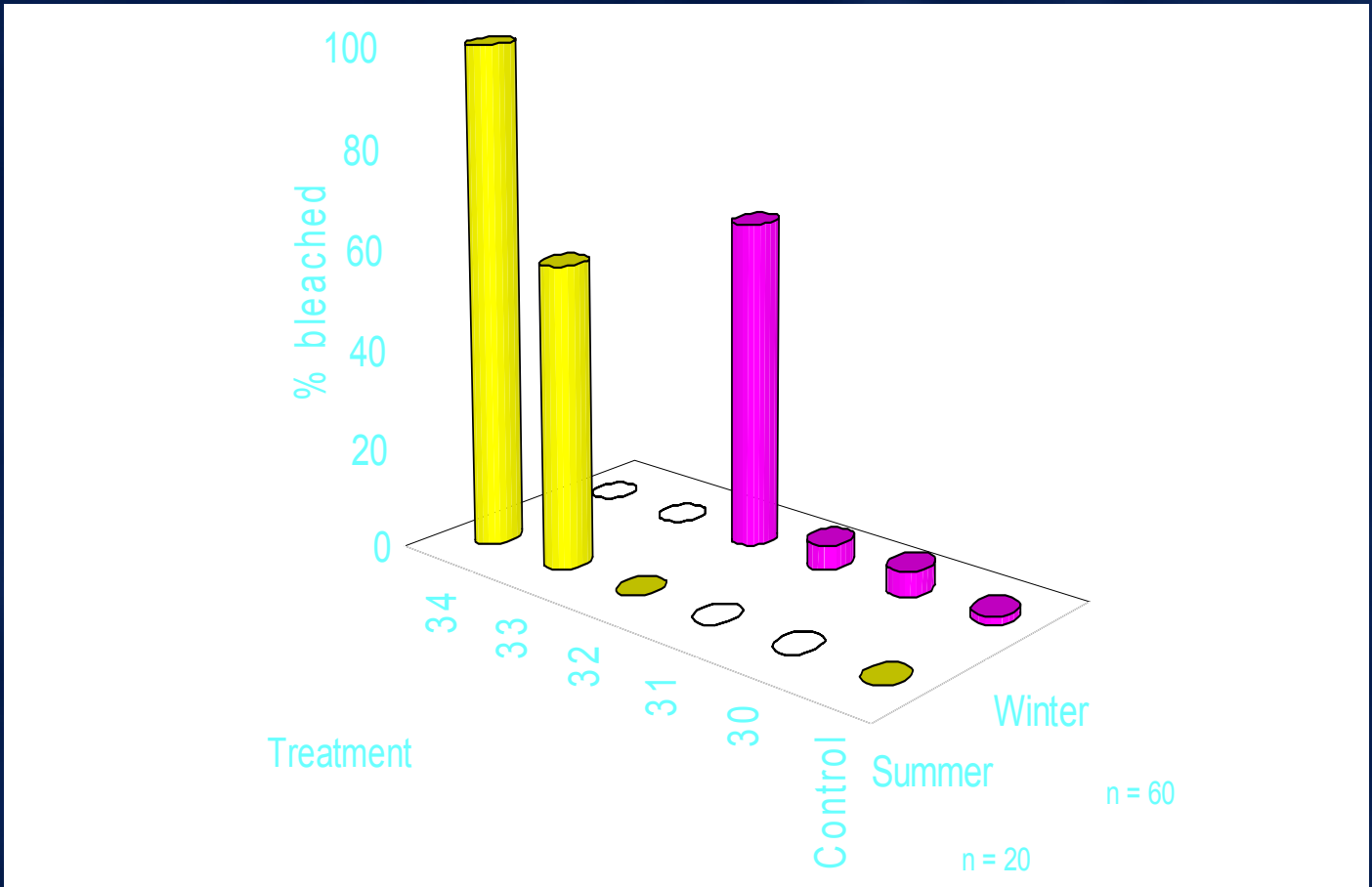
Temperature control precision



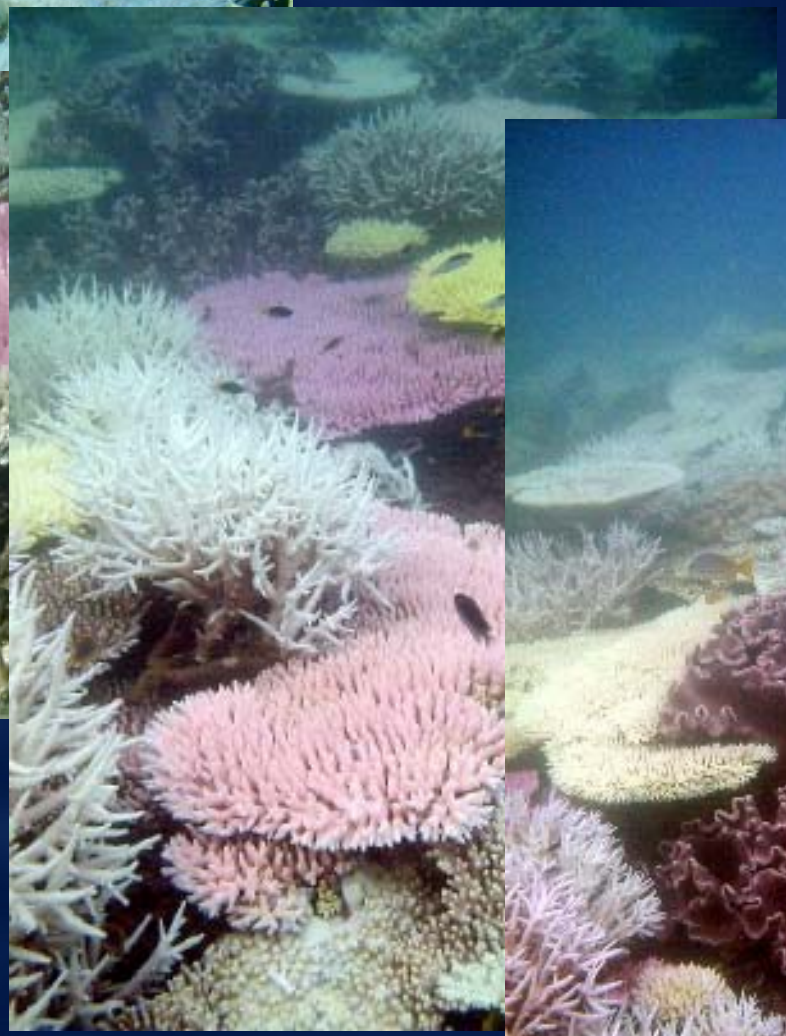
Controlling light

Seasonal acclimatization

***P. damicornis* – Orpheus Island**



Fluorescent corals



Conclusions

Temperature and time are by far the most important factors in explaining spatial and temporal variability in natural bleaching events

Temperature needs to be precisely controlled and treatments need to be spaced within small increments

- Light will also need to be precisely controlled and spatial variability accounted for!
- Genetic and seasonal variation need to be accounted for.
- Logistics of experimentation may be limit the number of species and temperature/light treatments