Impacts and trend of temperature

* Long term warming (long term temp modelling?)
  + (Hughes et al. 2017)
  + (Hughes et al. 2003)
  + (Pandolfi et al. 2011)
  + (Hoegh-Guldberg & Bruno 2010)
* Coral bleaching (Threshold DHD, heating rate (connected with Reef Temp)
  + Biological and ecological scale?
  + 2015/16 and 2016/17 bleaching events (Hughes et al. 2017 is probably more relevant here)
* Intensity and frequency of heatwaves over short term (intertwined with the bleaching)

Modelling Temperature

* eReefs – process based model that is nested (global<4km<1km, with in these there is a hydrodynamic model < biogeochemical model)
  + detail – go into the specifics of the model?
* ReefTemp – modelling impact of DHD using SST satellite
  + (Maynard et al. 2008)
  + (Garde et al. 2014)
* Satellite algorithms
* Subsurface temperature modelling (but still in reef building zone ~40 m) from SST
  + (Castillo & Lima 2010) – very relevant focused on coral reef making zones
  + (Akbari et al. 2017) – review of sub surface temp modelling but much deep then I wil be focused on eg. up to 2000m
* Generalised additive models (GAM) ??

Outline/flow of literature review

* Long-term warming patterns and the overall risk/impact to reefs
* short term temperature effects == heatwaves, DHD (increased intensity, frequency and longevity)
* direct impact of heating to coral == bleaching and mortality

the first part will lay out the background information (in detail) and why this work is important to study heatwaves on coral reefs in

* Modelling temperature == the types of model, how they were created and validated
  + eReefs
  + ReefTemp
  + Models used for other reefs
  + Satellite algorithms
* Subsurface == SST and sub-surface temperature predictions
  + Effectiveness
  + How others have adjusted these models

the second part leads closer to my research questions: comparing and creating models for the subsurface

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* Castillo KD, Lima FP (2010) Comparison of in situ and satellite-derived (MODIS-Aqua/Terra) methods for assessing temperatures on coral reefs. Limnology and Oceanography-Methods 8:107-117
* Garde LA, Spillman CM, Heron SF, Beeden RJ (2014) Reef Temp Next Generation:A new operational system for monitoring reef thermal stress. Journal of Operational Oceanography 7:21-33
* Hoegh-Guldberg O, Bruno JF (2010) The Impact of Climate Change on the World's Marine Ecosystems. Science 328:1523-1528
* Hughes TP, Baird AH, Bellwood DR, Card M, Connolly SR, Folke C, Grosberg R, Hoegh-Guldberg O, Jackson JBC, Kleypas J, Lough JM, Marshall P, Nystrom M, Palumbi SR, Pandolfi JM, Rosen B, Roughgarden J (2003) Climate change, human impacts, and the resilience of coral reefs. Science 301:929-933
* Hughes TP, Kerry JT, Alvarez-Noriega M, Alvarez-Romero JG, Anderson KD, Baird AH, Babcock RC, Beger M, Bellwood DR, Berkelmans R, Bridge TC, Butler IR, Byrne M, Cantin NE, Comeau S, Connolly SR, Cumming GS, Dalton SJ, Diaz-Pulido G, Eakin CM, Figueira WF, Gilmour JP, Harrison HB, Heron SF, Hoey AS, Hobbs JPA, Hoogenboom MO, Kennedy EV, Kuo CY, Lough JM, Lowe RJ, Liu G, Cculloch MTM, Malcolm HA, McWilliam MJ, Pandolfi JM, Pears RJ, Pratchett MS, Schoepf V, Simpson T, Skirving WJ, Sommer B, Torda G, Wachenfeld DR, Willis BL, Wilson SK (2017) Global warming and recurrent mass bleaching of corals. Nature 543:373-+
* Maynard JA, Turner PJ, Anthony KRN, Baird AH, Berkelmans R, Eakin CM, Johnson J, Marshall PA, Packer GR, Rea A, Willis BL (2008) ReefTemp: An interactive monitoring system for coral bleaching using high-resolution SST and improved stress predictors. Geophysical Research Letters 35
* Pandolfi JM, Connolly SR, Marshall DJ, Cohen AL (2011) Projecting Coral Reef Futures Under Global Warming and Ocean Acidification. Science 333:418-422