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

Akbari E, Alavipanah SK, Jeihouni M, Hajeb M, Haase D, Alavipanah S (2017) A Review of Ocean/Sea Subsurface Water Temperature Studies from Remote Sensing and Non-Remote Sensing Methods. Water 9

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

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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

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