SST Climatology Task Team Report

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William Skirving[6] and the Climatology Task Team

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[3]NCEI, Silver Spring, MD, USA

[4]Met Office, Exeter, UK

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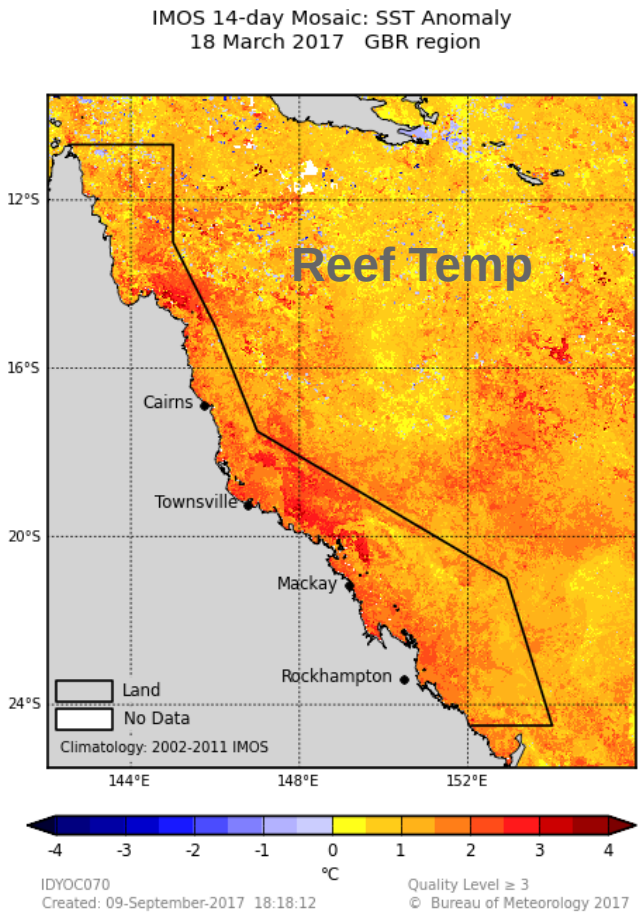
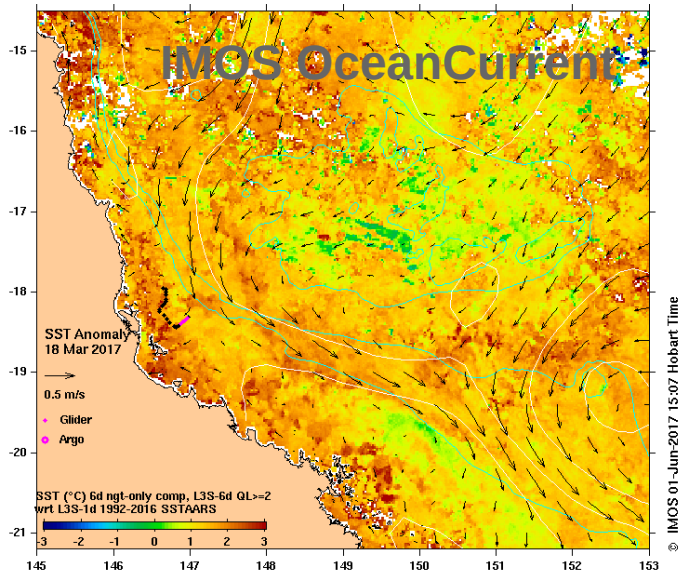
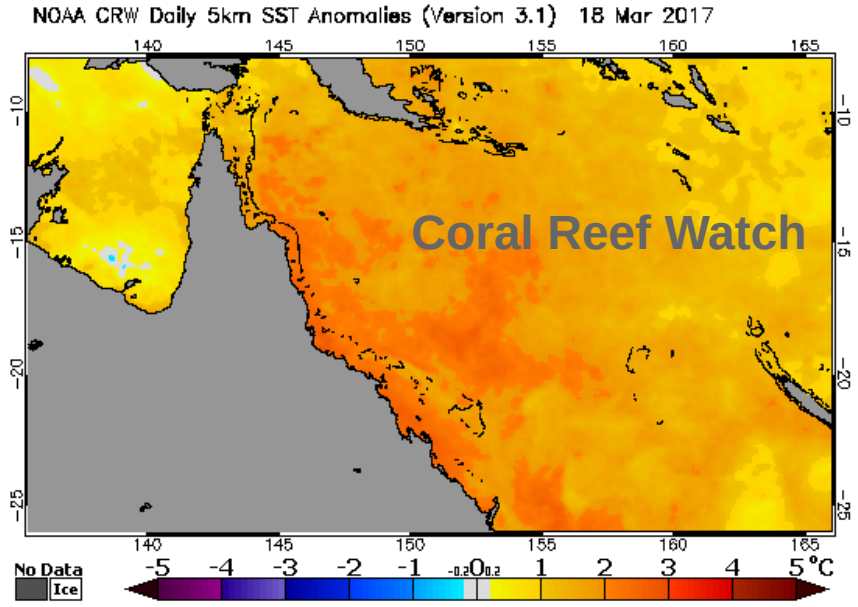
20th GHRSST Science Team Meeting, Frascati, Italy, 3rd – 7th June 2019

Why SST climatologies are important

In order to provide SST anomalies, percentiles or coral bleaching nowcasting metrics one needs to have a realistic and appropriate SST climatology. Particularly important for the study of long-term trends in Marine Heat Waves.







Climatology Task Team Members

- Helen Beggs (Bureau of Meteorology, Australia) – Coordinator
- Yuwei Hu (PhD student, UNSW Canberra)
- Jon Mittaz (Uni of Reading, UK)
- Simon Good (Met Office, UK)
- Sujuan Wang (CMA, China)
- Charlie Barron (NRLSSC, USA)
- Korak Saha (NOAA/NCEI, USA)
- Xuepeng Zhao (NOAA/NCEI, USA)
- Prasanjit Dash (NOAA/NESDIS/STAR, USA)
- Mark Eakin (NOAA CRW, USA)
- William Skirving (NOAA CRW, Australia)

Climatology Task Team Tasks

Initially working on the following questions:

- How best to produce a climatology from L3 (composite) or L4 (gap-free analysis) SSTs?
- What are the most suitable high resolution SST data sets for a climatology (homogeneous, stable, accurate)?
- How best to compare different climatology data sets, including those produced from L3S and L4 data?

Climatology Task Team Tasks

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- How best to produce a climatology from L3 (composite) or L4 (gap-free analysis) SSTs? (e.g. Wijffels et al., 2018, J Mar Sci)
- What are the most suitable high resolution SST data sets for a climatology (homogeneous, stable, accurate)? (Yuwei Hu, UNSW-Canberra – Poster Thur 5:30 pm)
- How best to compare different climatology data sets, including those produced from L3S and L4 data? (Anyone???)

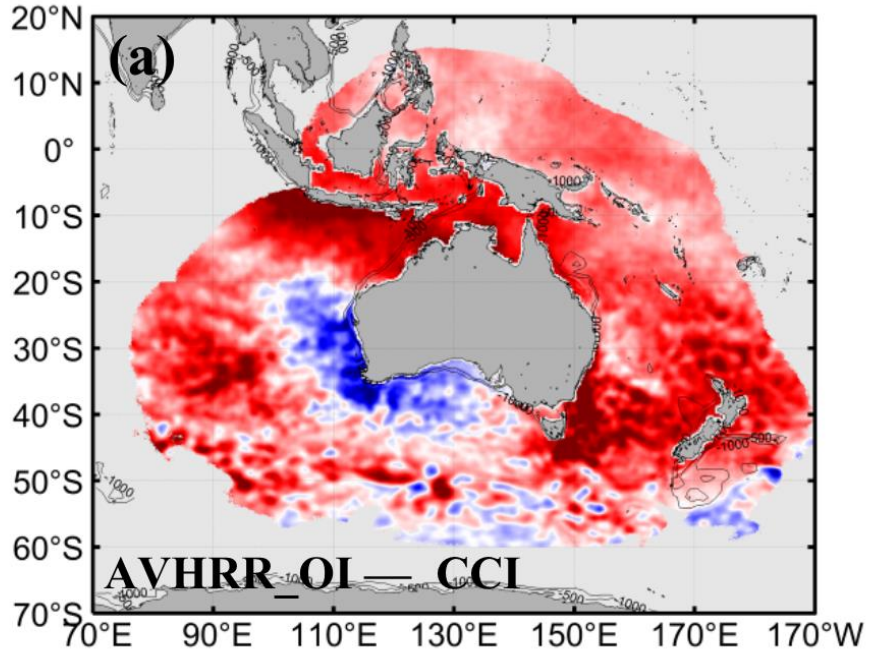
New SST Climatology Data Sets

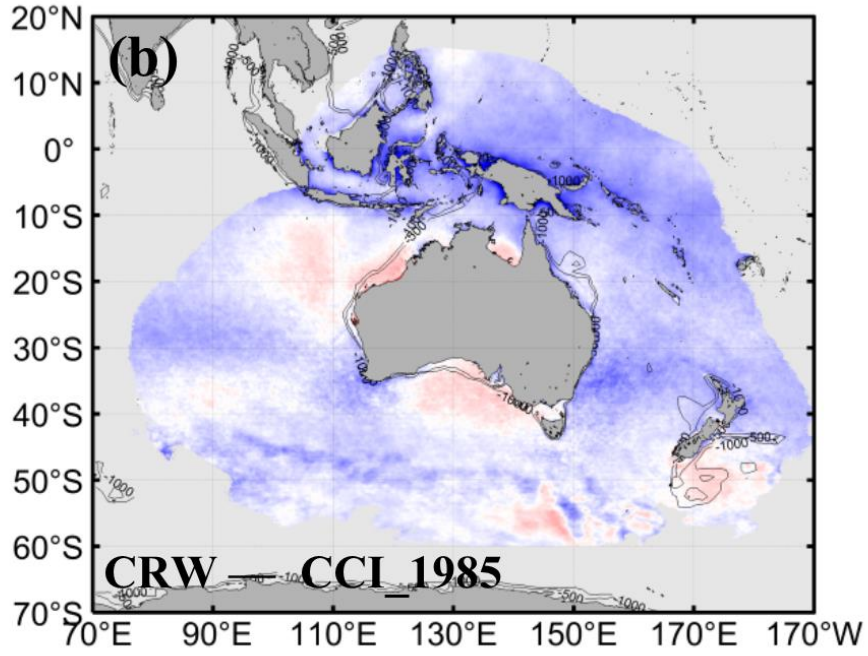
- ESA SST Climate Change Initiative (CCI) version 2.1 Daily 0.05° SST(0.2m) Climatology (1982 – 2010), derived from averaging daily SST_CCI v2.1 L4, available for 1981 – 2016
  - To be released very soon!
  - https://catalogue.ceda.ac.uk/uuid/aced40d7cb964f23a0fd3e85772f2d48
- JPL MUR Daily 0.01° SSTfnd Climatology (2003 - 2014), derived from averaging MUR v4.1 L4
  - https://podaac-tools.jpl.nasa.gov/measures-drive/files/mur_sst/tmchin/seasonal/
- NOAA/NCEI CoRTADv6 0.04° Daily SST climatology, anomalies and percentiles (1982 – 2017), derived from Pathfinder v5.3 AVHRR L3C
  - Available since Sep 2018. Data are updated each year.
  - https://doi.org/10.25921/ffw7-cs39
- CSIRO SSTAARS 0.02° Daily SST(0.2m) Australasian climatology (1992 – 2016), derived from night-only IMOS HRPT AVHRR L3S data
  - Available from http://portal.aodn.org.au - Search for "SSTAARS"
  - Wijffels et al. (2018) J. Mar. Sci., 187. https://doi.org/10.1016/j.jmarsys.2018.07.005

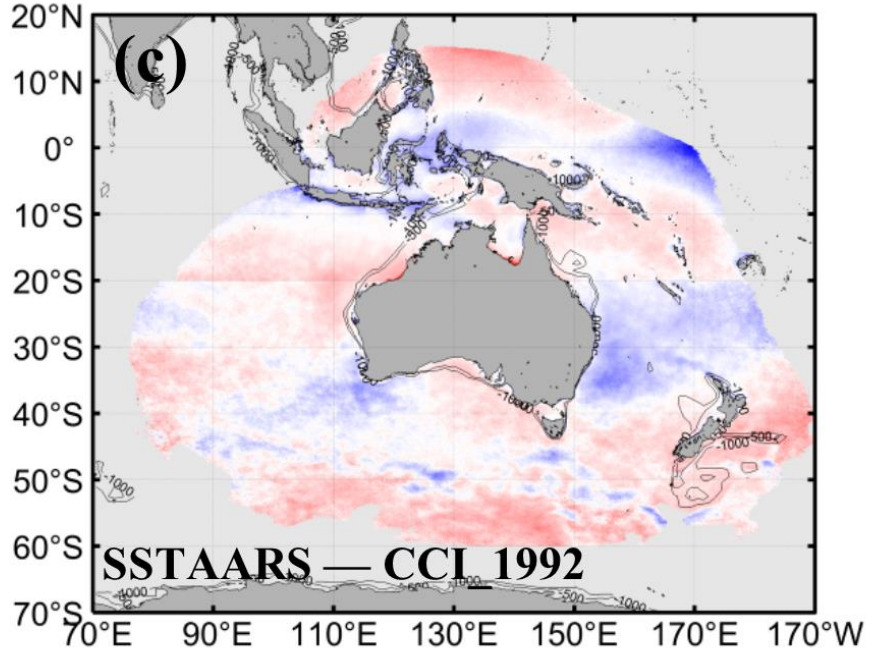
Yuwei Hu's study of SST climatology datasets over Australian region

Climatology Datasets	Attributes				
	Spatial Resolution	Temporal Resolution	Reference Period	Data Source	Calculation Algorithm
CCI	0.05° (~5 km)	Daily, Monthly	1981-2016 (36 years)	Climate Change Initiative (CCI) SST version 2 analyses (daily SST0.2m)	Daily and Monthly averaging
AVHRR_OI	0.25° (~25 km)	Daily	1981-2016 (36 years)	NCEI AVHRR-only OISST v2 analyses (daily SST0.2m)	Daily averaging then bicubic interpolation to 0.05°
CRW	0.05° (~5 km)	Monthly	1985-2012 (28 years)	OSTIA Reanalysis (1985 - 2002) NOAA Geo-Polar Blended SST reanalysis (2002 – 2012) (daily night-time SST0.2m)	• Linear interpolation • Monthly averaging • Bias adjustment
SSTAARS	0.02° (~2 km)	Daily	1992-2016 (25 years)	Bias corrected version 1 and version 2 IMOS one-day composite night-time AVHRR SST0.2m L3S data (quality level ≥ 4)	• Parametric model fitting • Climatology reconstruction
BRAN	0.1° (~10 km)	Daily	1994-2016 (23 years)	BRAN_2016 ocean reanalysis (daily SST2.5m)	Daily averaging then bicubic interpolation to 0.05°

Mean relative bias plots







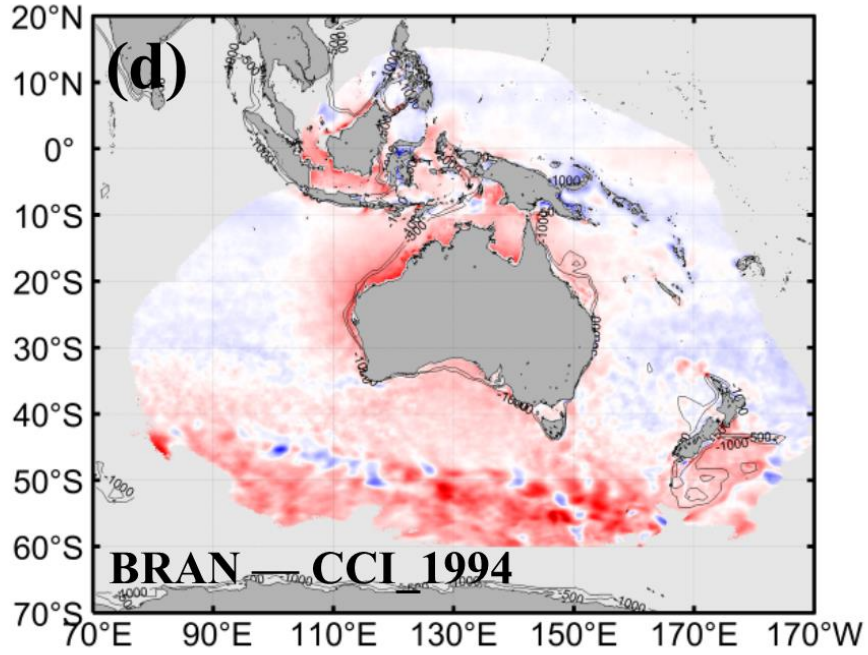
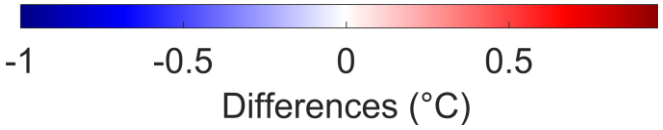
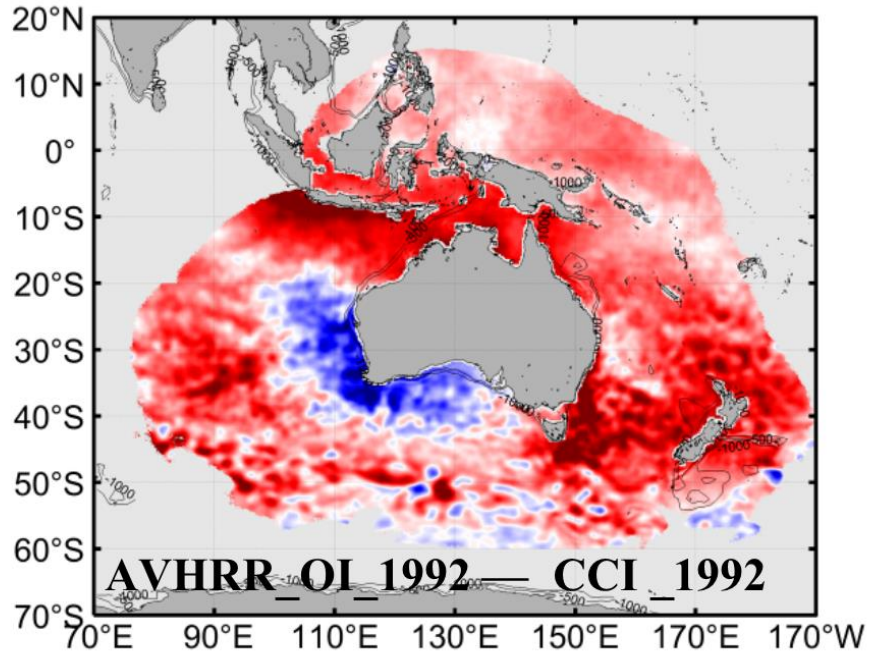
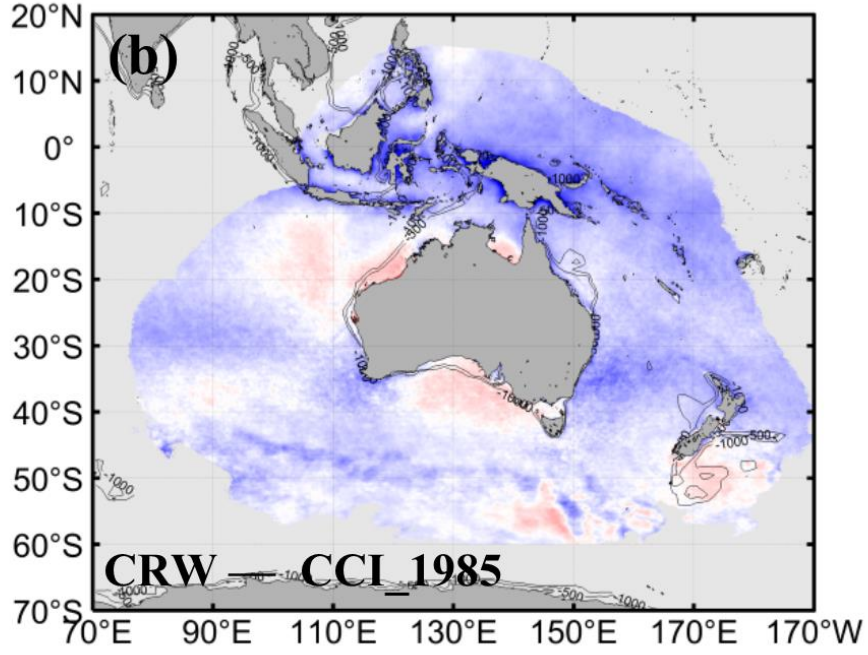


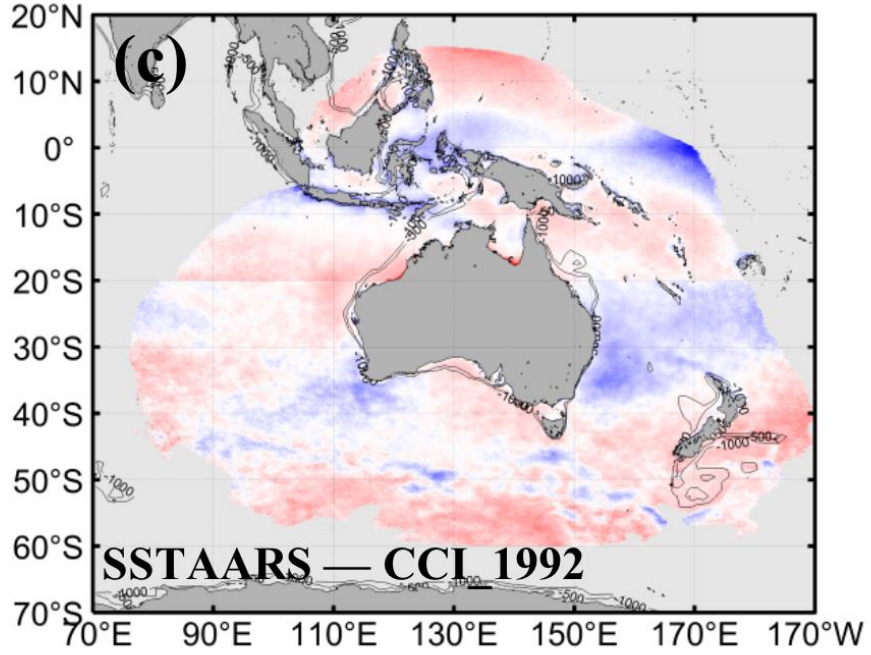
Figure. Spatial distribution of mean relative bias(°C) of group (a) AVHRR_OI – CCI, (b) CRW – CCI_1985, (c) SSTAARS – CCI_1992 and (d) BRAN – CCI_1994.



Mean relative bias plots







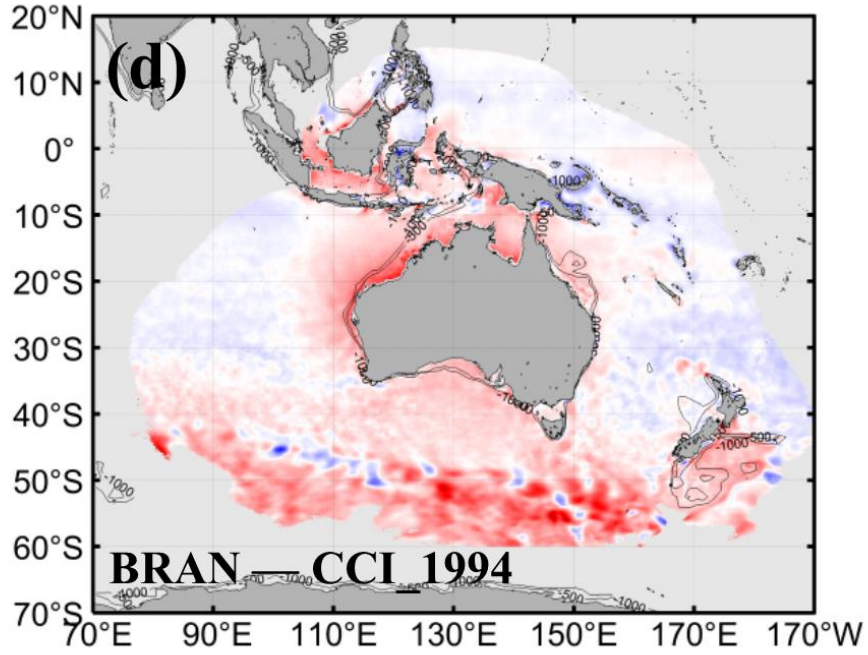
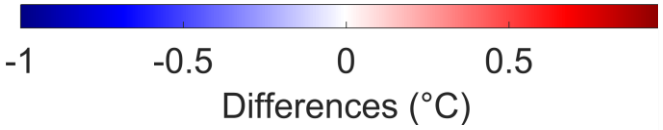


Figure. Spatial distribution of mean relative bias(°C) of group (a) AVHRR_OI_1992 – CCI_1992, (b) CRW – CCI_1985, (c) SSTAARS – CCI_1992 and (d) BRAN – CCI_1994.



STD plots

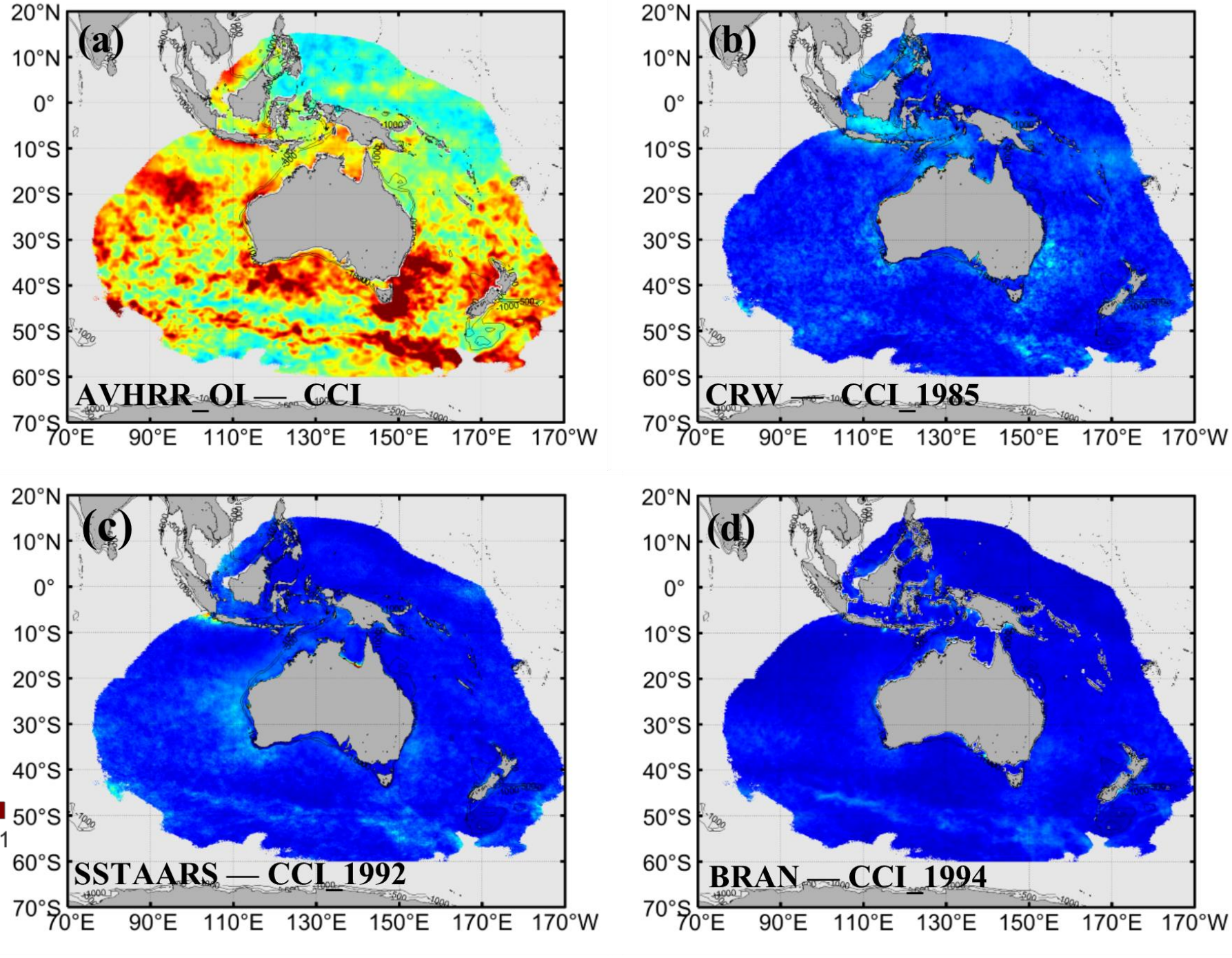


Figure. Spatial distribution of STD(^{0}C) of group (a) AVHRR_OI – CCI, (b) CRW – CCI_1985, (c) SSTAARS – CCI_1992 and (d) BRAN – CCI_1994.

Hovmöller plots

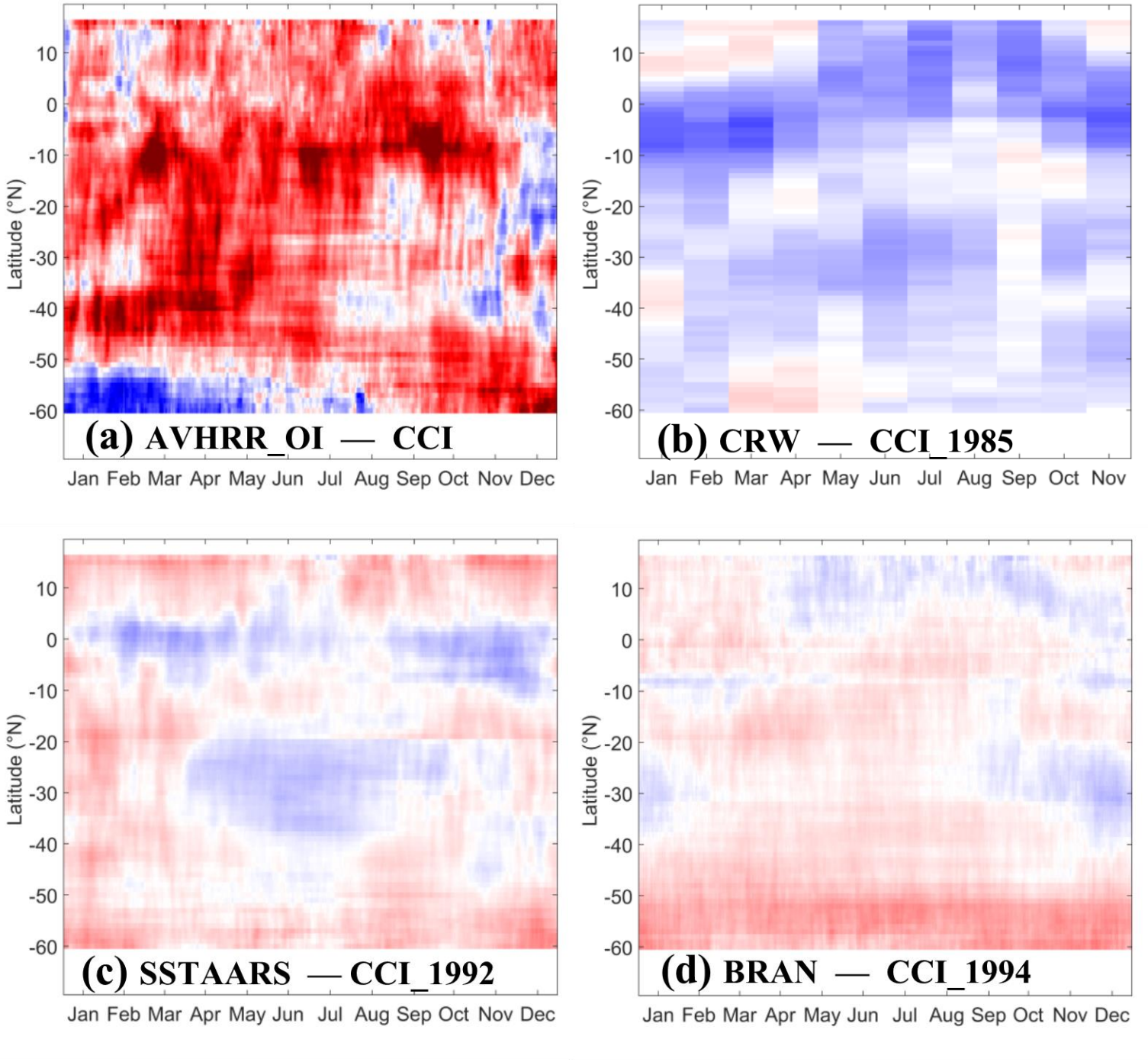


Figure. Hovmöller plots(°C) of group (a) AVHRR_OI – CCI, (b) CRW – CCI_1985, (c) SSTAARS – CCI_1992 and (d) BRAN – CCI_1994.

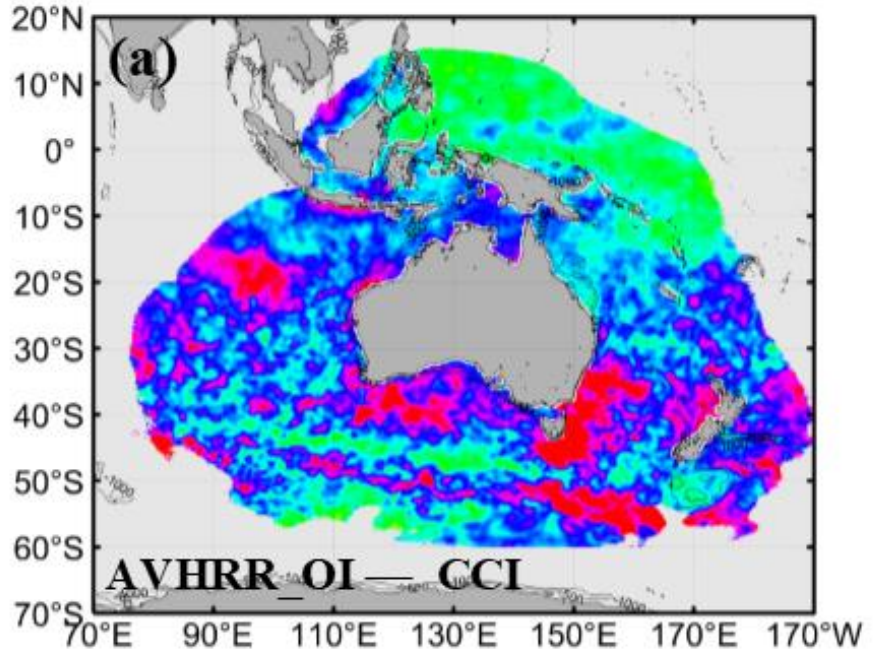
Comments?
Questions?

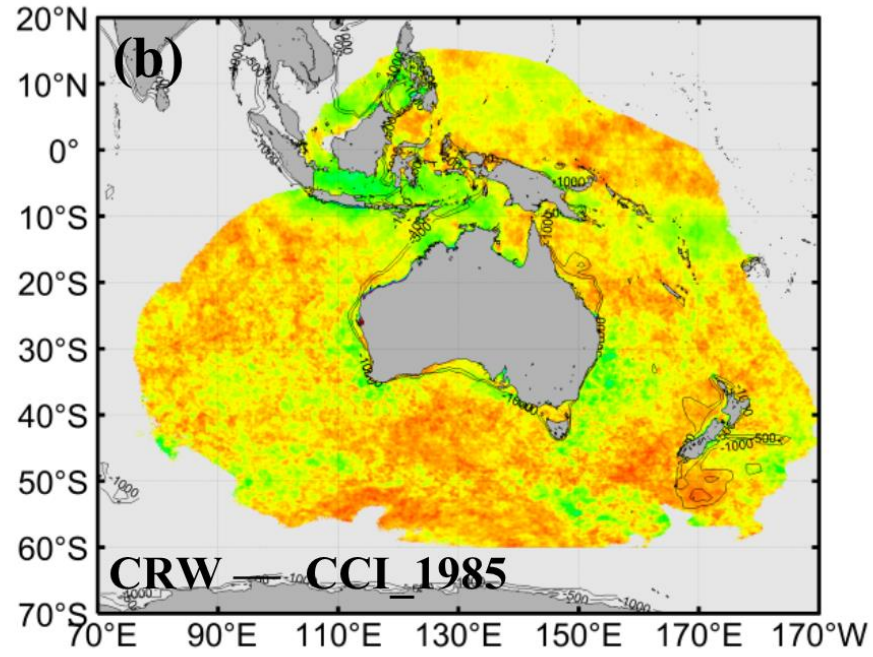
Propose meet over Thursday Lunch to discuss
Task Team Activities for 2019-2020

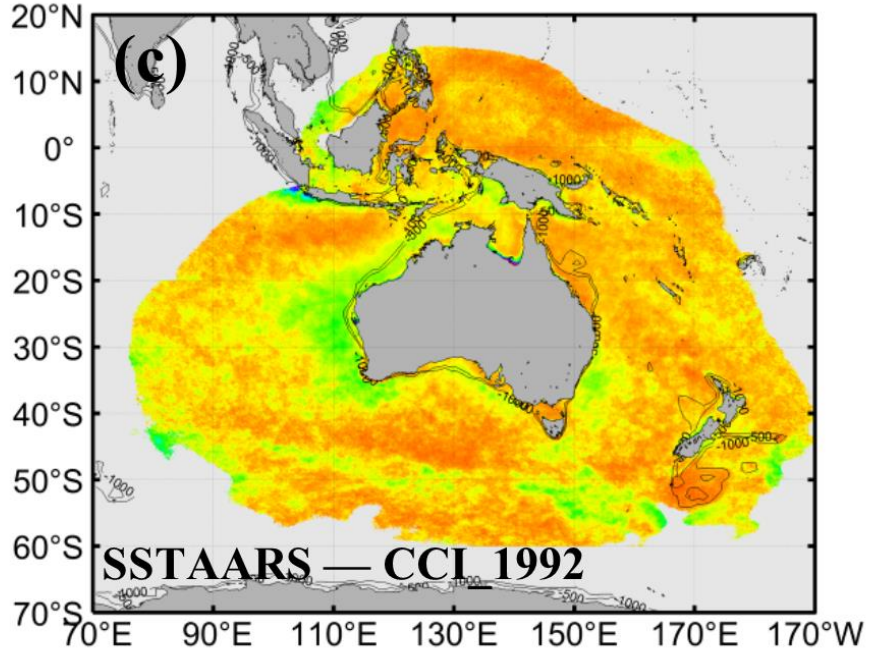
New members welcome!

Contact: helen.beggs@bom.gov.au

STD plots







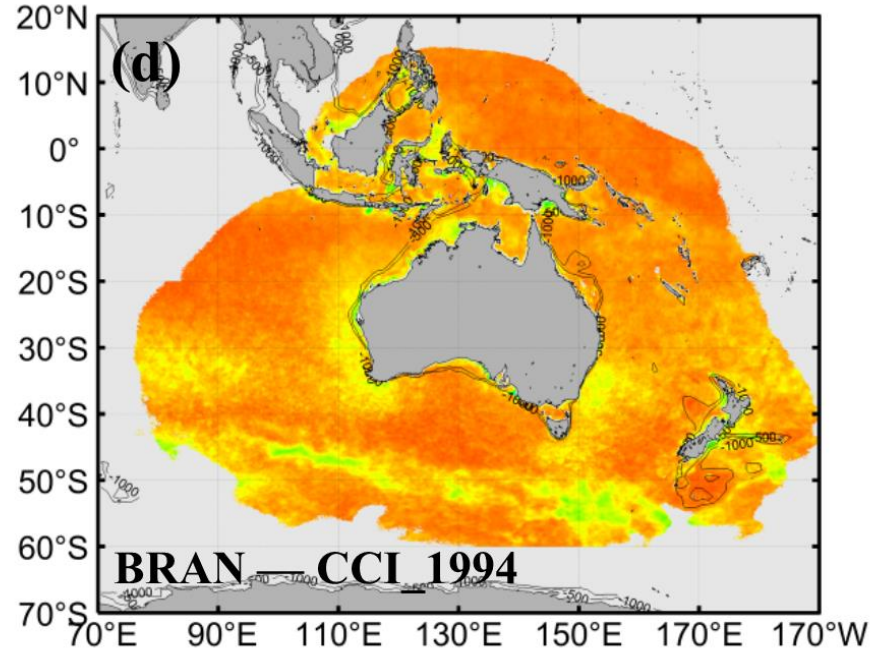


Figure. Spatial distribution of STD(^{o}C) of group (a) AVHRR_OI – CCI, (b) CRW – CCI_1985, (c) SSTAARS – CCI_1992 and (d) BRAN – CCI_1994.