Submission to Queensland Floods Commission of Inquiry

Preamble

Climate Scientists have observed that the present La Niña climate event is either the strongest or second strongest ever recorded with the Southern Oscillation Index (SOI) from October to December 2010 having the largest positive values ever measured.

It appeared to me that the connection between strong La Niña periods and heavy rainfall and floods in Queensland should be able to be interpreted and used for predicting weather. I then compared the sea surface cooling tables produced by the USA National Oceanic and Atmospheric Administration (NOAA) since 1950 with our Maleny Tamarind St, Qld rainfall records measured since 1915 and found that the correlation between the two was quite remarkable.
Maleny rainfall figures were used because I have my own rain gauge south of Maleny and rain that falls on the southern end of the Blackall Range near Maleny flows into the Stanley River and on to Somerset Dam.

Australian Bureau of Meteorology (BOM) Performance

The comparison tables with this submission show that where the La Niña cooling in the equatorial regions is over 1°C you can generally expect a big increase in rainfall between December and April – the lower the temperature the higher the rainfall. I asked myself that if I could see the clear connection between the two, surely alarm bells would be ringing in the BOM climate models and much stronger warnings should be issued about potentially disastrous flash flooding and longer term floods throughout Queensland.

The BOM must have realised that the weather pattern was very similar to the 1973/74 La Niña which caused widespread flooding in most Australian States but their warnings were generally extremely mild with advice that we should expect higher than normal rainfall and an increase in the number of cyclones.

The question that needs to be answered is “was there political pressure exerted on the BOM to tone down their warnings because of the damage they would cause to the Queensland tourist industry”? Whether or not this was true the fact is that the BOM’s purpose is to use all the resources at its disposal to predict the weather and warn of dangerous impending weather events. Cyclone Yasi was well covered but flood warnings were far too late.

The disclaimers that the BOM and the Commonwealth Scientific and Industrial Research Organisation (CSIRO) use in predicting weather or projections on future climate appear to show that they have little faith in their work. The BOM website disclaimer basically states that it is not responsible for any information it publishes, which may not be accurate, current or complete and is subject to change without notice. The Climate Change in Australia website Technical Report 2007 disclaimer says “no responsibility will be accepted by CSIRO or BOM for the accuracy of projections in this report”.

I understand that predicting the weather is a scientifically complex and uncertain art and liability for mistakes has to be limited but surely the lawyers can produce a disclaimer which allows for some competency by these organisations.

In the Private Sector this sloppiness would not be tolerated and as a retired Land and Engineering Surveyor who had to guarantee that his work was correct I find it unbelievable. The Federal Government is relying on these two organisations to make the predictions and projections on Global Warming that it is using to bring in a Carbon Tax and if they are wrong it is going to cost Australian Taxpayers billions of dollars.

Learning from the Past

The use of historical records of rainfall and floods is a very strong tool for predicting future events and does not appear to have been used very well by authorities. Flash flooding in the Lockyer Valley has occurred many times since European settlement and has been well documented. Why then has no warning system been devised to warn residents in flood prone areas of the potential for catastrophic flooding?

The La Niña induced heavy rainfall throughout December 2010 must surely have worried residents who had seen previous floods and were relying on the BOM for warnings. The storm that caused the Toowoomba and Lockyer Creek floods had been building up for weeks and though its intensity could not be predicted the possible effects could certainly have been foreseen.

Inigo Jones (1872-1954) meteorologist and famous long range weather forecaster recorded an Australian record 958 mm of rain on 2nd February 1893 at his observatory at Crohamhurst near Maleny and 1956 mm of rain over four days. Needless to say the Brisbane River flood generated by this rainfall was huge rising to a level of 8.35 metres in Brisbane. An earlier flood in 1841 was apparently even higher at 8.43 metres. In recent memory I witnessed the January 1974 flood which reached 5.45 metres in Brisbane and in January this year the flood level was 4.46 metres.

These records show that much larger floods have happened in the past and will happen again so we must be prepared for them. Brisbane Lord Mayor Campbell Newman was the only public figure warning in October and December 2010 that conditions were very similar to 1973/74 with predicted high tides and saturated catchment areas. With his engineering background he could see that heavy rainfall in the Brisbane River catchments would probably trigger another flood situation.

In January 1974 steady rain up to the 19th totalled 636 mm in the Maleny rain gauge, then we had three dry days and 49 mm on 23rd January. From 24th to 27th January the remains of Cyclone Wanda dumped 807 mm of rain in four days on Maleny with 332 mm falling on the 24th and the resultant runoff in the Brisbane River catchments caused the 1974 flood.

In December 2010 continuous rain throughout the month totalled 711 mm in Maleny and soaked the Bremer, Lockyer and Brisbane catchments. We had only light rain in January up to the 8th with a total of 106 mm. From 9th to 12th January 2011 we received 689 mm of rain including 282 mm on the 10th with the storm that hit Toowoomba passing directly over Maleny (I measured 381 mm that day in my rain gauge 4km south of Maleny).

As you can see from the above figures the 1974 and 2011 flood events were similar in rainfall totals. With the information at the BOM's disposal the Wivenhoe Dam management should have had all these historical records and the latest predictions at their finger tips and keeping the dam above 100% capacity in early January 2011 is hard to understand. I'm sure the dam engineers would have released water much sooner had they known about the implications of the La Niña effect and the probable rainfall they were likely to receive.

Wivenhoe Dam

I have worked on several large water storage and flood mitigation projects during my professional career including two hydro electricity schemes in New Zealand and Papua New Guinea. I did resumption surveys for Wivenhoe Dam in 1974 and recently in 2008 used a bathymetric and a photogrammetric aerial survey to calculate the capacity of a dam and reservoir in NW Queensland, so I have a reasonable knowledge of the subject.

The installation of the secondary spillway on Wivenhoe Dam which is 163 metres wide with a central “fuse plug” embankment 34 metres wide that is triggered at EL75.7m appears to have drastically reduced the flood mitigation capacity of the dam. The 1,450GL or 225% figure given as the Maximum Flood Storage (MFS) capacity at EL80m is completely misleading. The top of the Main Dam Wave Wall is 300mm lower at EL79.7m and the true MFS level calculation should be based on the initiation levels of the secondary spillway “fuse plugs” from EL75.7m up to EL76.7m. I understand that only 1,080GL of flood storage capacity was available at EL75m which was close to the highest level reached during the January 2011 flood when all 5 sluice gates were opened on the main spillway to stop the flood water rising above the trigger point level at EL75.7m.

The fact that the Wivenhoe Dam water level has now been dropped to approximately 75% of the Full Supply Level (FSL) capacity of 1,165GL (100%) at EL 67m, infers that management have been given information by the BOM which shows that further heavy rain is likely and my tables bear this out when you look at previous La Niña March rainfall totals.

Conclusion

It is to be hoped that this enquiry will not automatically exonerate the BOM for its lack of accurate and timely information and that the possible political interference in the dissemination of early flood warnings and dam management issues will be thoroughly investigated.

Attachments

(1) Comparison of La Niña sea surface Cooling Tables with historical Maleny, Qld monthly Rainfall totals.
(2) USA, NOAA, National Weather Service, Climate Prediction Service - Tables back to 1950 showing changes to the Oceanic Niño Index (ONI) in the equatorial region.

Acknowledgements

(1) USA, NOAA, National Weather Service for the use of their Tables mentioned above which are considered public information and may be distributed or copied.
(2) Australian Bureau of Meteorology for use of the rainfall figures from their website and ENSO sea surface cooling figures for January and February 2011. Their copyright is acknowledged.

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Comparison of La Niña sea surface Cooling Tables with historical Maleny,Qld monthly Rainfall Totals

La Niña Period	1949/50	1950/51	1954/55	1955/56	1956/57	1964/65	1967/68	1970/71	1971/72	1973/74	1974/75	1975/76
Dec Cooling °C	?	-1.0	-1.1	-1.9	-0.8	-1.0	-0.5	-1.1	-0.9	-2.1	-0.7	-1.7
Dec Rainfall mm	152	292	37	266	281	111	96	729	288	245	29	322
Jan Cooling °C	-1.7	-1.0	-1.0	-1.3	-0.5	-0.8	-0.7	-1.3	-0.7	-1.9	-0.6	-1.6
Jan Rainfall mm	339	900	130	386	169	183	899	376	282	1534	217	659
Feb Cooling °C	-1.5	-0.9	-0.9	-0.9	-0.1	-0.4	-0.9	-1.3	-0.4	-1.7	-0.6	-1.2
Feb Rainfall mm	826	276	241	507	179	93	312	771	1275	259	136	427
Mar Cooling °C	-1.3	-0.6	-0.9	-0.7		-0.2	-0.8	-1.1	0.0	-1.3	-0.7	-0.8
Mar Rainfall mm	398	427	977	1165		37	190	285	248	580	71	823
Apr Cooling °C	-1.4		-1.0	-0.6			-0.7	-0.9		-1.1	-0.8	-0.6
Apr Rainfall mm	196		470	181			59	109		396	189	226

La Niña Period	1984/85	1988/89	1998/99	1999/20	2000/01	2007/08	2010/11
Dec Cooling °C	-1.1	-1.9	-1.4	-1.6	-0.7	-1.3	-1.4
Dec Rainfall mm	148	627	117	325	175	236	711
Jan Cooling °C	-0.9	-1.7	-1.4	-1.6	-0.6	-1.4	-1.5
Jan Rainfall mm	251	167	277	85	47	565	903
Feb Cooling °C	-0.8	-1.5	-1.2	-1.4	-0.5	-1.4	-1.4
Feb Cooling mm	108	258	880	296	356	413	235
Mar Cooling °C	-0.7	-1.1	-0.9	-1.0	-0.4	-1.1	
Mar Rainfall mm	474	505	315	116	205	143	
Apr Cooling °C	-0.7	-0.8	-0.8	-0.8	-0.2	-0.8	
Apr Rainfall mm	83	1052	143	233	102	40	

NOTES

(1) Monthly rainfall over 300 mm highlighted in red to show higher rainfall months

(2) Sea surface cooling temps taken from USA NOAA monitoring tables produced since 1950

(3) Rainfall totals taken from Australian BOM monthly rainfall tables for Maleny, Tamarind St commencing 1915

(4) Figures are shown from December to April because La Niña often seems to increase rainfall intensity from December and ease off by the end of April

Cold & Warm Episodes by Season

Changes to the Oceanic Niño Index (ONI)

Link to Previous Version of ONI (ERSST.v3)

DESCRIPTION: Warm (red) and cold (blue) episodes based on a threshold of +/- 0.5°C for the Oceanic Niño Index (ONI) [3 month running mean of ERSST.v3b SST anomalies in the Niño 3.4 region (5°N-5°S, 120°-170°W)], based on the 1971-2000 base period. For historical purposes cold and warm episodes (blue and red colored numbers) are defined when the threshold is met for a minimum of 5 consecutive over-lapping seasons.

Year	DJF	JFM	FMA	MAM	AMJ	MJJ	JJA	JAS	ASO	SON	OND	NDJ
1950	-1.7	-1.5	-1.3	-1.4	-1.3	-1.1	-0.8	-0.8	-0.8	-0.9	-0.9	-1.0
1951	-1.0	-0.9	-0.6	-0.3	-0.2	0.2	0.4	0.7	0.7	0.8	0.7	0.6
1952	0.3	0.1	0.1	0.2	0.1	-0.1	-0.3	-0.3	-0.2	-0.2	-0.1	0.0
1953	0.2	0.4	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4
1954	0.5	0.3	-0.1	-0.5	-0.7	-0.7	-0.8	-1.0	-1.2	-1.1	-1.1	-1.1
1955	-1.0	-0.9	-0.9	-1.0	-1.0	-1.0	-1.0	-1.0	-1.4	-1.8	-2.0	-1.9
1956	-1.3	-0.9	-0.7	-0.6	-0.6	-0.6	-0.7	-0.8	-0.8	-0.9	-0.9	-0.8
1957	-0.5	-0.1	0.3	0.6	0.7	0.9	0.9	0.9	0.9	1.0	1.2	1.5
1958	1.7	1.5	1.2	0.8	0.6	0.5	0.3	0.1	0.0	0.0	0.2	0.4
1959	0.4	0.5	0.4	0.2	0.0	-0.2	-0.4	-0.5	-0.4	-0.3	-0.2	-0.2
1960	-0.3	-0.3	-0.3	-0.2	-0.2	-0.2	-0.1	0.0	-0.1	-0.2	-0.2	-0.2
1961	-0.2	-0.2	-0.2	-0.1	0.1	0.2	0.0	-0.3	-0.6	-0.6	-0.5	-0.4
1962	-0.4	-0.4	-0.4	-0.5	-0.4	-0.4	-0.3	-0.3	-0.5	-0.6	-0.7	-0.7
1963	-0.6	-0.3	0.0	0.1	0.1	0.3	0.6	0.8	0.9	0.9	1.0	1.0
1964	0.8	0.4	-0.1	-0.5	-0.8	-0.8	-0.9	-1.0	-1.1	-1.2	-1.2	-1.0
1965	-0.8	-0.4	-0.2	0.0	0.3	0.6	1.0	1.2	1.4	1.5	1.6	1.5
1966	1.2	1.0	0.8	0.5	0.2	0.2	0.2	0.0	-0.2	-0.2	-0.3	-0.3
1967	-0.4	-0.4	-0.6	-0.5	-0.3	0.0	0.0	-0.2	-0.4	-0.5	-0.4	-0.5
1968	-0.7	-0.9	-0.8	-0.7	-0.3	0.0	0.3	0.4	0.3	0.4	0.7	0.9
1969	1.0	1.0	0.9	0.7	0.6	0.5	0.4	0.4	0.6	0.7	0.8	0.7
1970	0.5	0.3	0.2	0.1	0.0	-0.3	-0.6	-0.8	-0.9	-0.8	-0.9	-1.1
1971	-1.3	-1.3	-1.1	-0.9	-0.8	-0.8	-0.8	-0.8	-0.8	-0.9	-1.0	-0.9
1972	-0.7	-0.4	0.0	0.2	0.5	0.8	1.0	1.3	1.5	1.8	2.0	2.1
1973	1.8	1.2	0.5	-0.1	-0.6	-0.9	-1.1	-1.3	-1.4	-1.7	-2.0	-2.1
1974	-1.9	-1.7	-1.3	-1.1	-0.9	-0.8	-0.6	-0.5	-0.5	-0.7	-0.9	-0.7
1975	-0.6	-0.6	-0.7	-0.8	-0.9	-1.1	-1.2	-1.3	-1.5	-1.6	-1.7	-1.7
1976	-1.6	-1.2	-0.8	-0.6	-0.5	-0.2	0.1	0.3	0.5	0.7	0.8	0.7
1977	0.6	0.5	0.2	0.2	0.2	0.4	0.4	0.4	0.5	0.6	0.7	0.7
1978	0.7	0.4	0.0	-0.3	-0.4	-0.4	-0.4	-0.4	-0.4	-0.3	-0.2	-0.1
1979	-0.1	0.0	0.1	0.1	0.1	-0.1	0.0	0.1	0.3	0.4	0.5	0.5

1980	0.5	0.3	0.2	0.2	0.3	0.3	0.2	0.0	-0.1	-0.1	0.0	-0.1
1981	-0.3	-0.5	-0.5	-0.4	-0.3	-0.3	-0.4	-0.4	-0.3	-0.2	-0.1	-0.1
1982	0.0	0.1	0.1	0.3	**0.6**	**0.7**	**0.7**	**1.0**	**1.5**	**1.9**	**2.2**	**2.3**
1983	**2.3**	**2.0**	**1.5**	**1.2**	**1.0**	**0.6**	0.2	-0.2	-0.6	-0.8	-0.9	-0.7
1984	-0.4	-0.2	-0.2	-0.3	-0.5	-0.4	-0.3	-0.2	-0.3	**-0.6**	**-0.9**	**-1.1**
1985	**-0.9**	**-0.8**	**-0.7**	**-0.7**	**-0.7**	**-0.6**	**-0.5**	**-0.5**	**-0.5**	-0.4	-0.3	-0.4
1986	-0.5	-0.4	-0.2	-0.2	-0.1	0.0	0.3	**0.5**	**0.7**	**0.9**	**1.1**	**1.2**
1987	**1.2**	**1.3**	**1.2**	**1.1**	**1.0**	**1.2**	**1.4**	**1.6**	**1.6**	**1.5**	**1.3**	**1.1**
1988	**0.7**	**0.5**	0.1	-0.2	**-0.7**	**-1.2**	**-1.3**	**-1.2**	**-1.3**	**-1.6**	**-1.9**	**-1.9**
1989	**-1.7**	**-1.5**	**-1.1**	**-0.8**	**-0.6**	-0.4	-0.3	-0.3	-0.3	-0.3	-0.2	-0.1
1990	0.1	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.4
1991	0.4	0.3	0.3	0.4	**0.6**	**0.8**	**1.0**	**0.9**	**0.9**	**1.0**	**1.4**	**1.6**
1992	**1.8**	**1.6**	**1.5**	**1.4**	**1.2**	**0.8**	**0.5**	0.2	0.0	-0.1	0.0	0.2
1993	0.3	0.4	0.6	0.7	0.8	0.7	0.4	0.4	0.4	0.4	0.3	0.2
1994	0.2	0.2	0.3	0.4	**0.5**	**0.5**	**0.6**	**0.6**	**0.7**	**0.9**	**1.2**	**1.3**
1995	**1.2**	**0.9**	**0.7**	0.4	0.3	0.2	0.0	-0.2	**-0.5**	**-0.6**	**-0.7**	**-0.7**
1996	**-0.7**	**-0.7**	**-0.5**	-0.3	-0.1	-0.1	0.0	-0.1	-0.1	-0.2	-0.3	-0.4
1997	-0.4	-0.3	0.0	0.4	**0.8**	**1.3**	**1.7**	**2.0**	**2.2**	**2.4**	**2.5**	**2.5**
1998	**2.3**	**1.9**	**1.5**	**1.0**	**0.5**	0.0	**-0.5**	**-0.8**	**-1.0**	**-1.1**	**-1.3**	**-1.4**
1999	**-1.4**	**-1.2**	**-0.9**	**-0.8**	**-0.8**	**-0.8**	**-0.9**	**-0.9**	**-1.0**	**-1.1**	**-1.3**	**-1.6**
2000	**-1.6**	**-1.4**	**-1.0**	**-0.8**	**-0.6**	**-0.5**	-0.4	-0.4	-0.4	**-0.5**	**-0.6**	**-0.7**
2001	**-0.6**	**-0.5**	-0.4	-0.2	-0.1	0.1	0.2	0.2	0.1	0.0	-0.1	-0.1
2002	-0.1	0.1	0.2	0.4	**0.7**	**0.8**	**0.9**	**1.0**	**1.1**	**1.3**	**1.5**	**1.4**
2003	**1.2**	**0.9**	**0.5**	0.1	-0.1	0.1	0.4	0.5	0.6	0.5	0.6	0.4
2004	0.4	0.3	0.2	0.2	0.3	**0.5**	**0.7**	**0.8**	**0.9**	**0.8**	**0.8**	**0.8**
2005	**0.7**	**0.5**	0.4	0.4	0.4	0.4	0.4	0.3	0.2	-0.1	-0.4	-0.7
2006	-0.7	-0.6	-0.4	-0.1	0.1	0.2	0.3	**0.5**	**0.6**	**0.9**	**1.1**	**1.1**
2007	**0.8**	0.4	0.1	-0.1	-0.1	-0.1	-0.1	-0.4	**-0.7**	**-1.0**	**-1.1**	**-1.3**
2008	**-1.4**	**-1.4**	**-1.1**	**-0.8**	**-0.6**	-0.4	-0.1	0.0	0.0	0.0	-0.3	-0.6
2009	-0.8	-0.7	-0.5	-0.1	0.2	**0.6**	**0.7**	**0.8**	**0.9**	**1.2**	**1.5**	**1.8**
2010	**1.7**	**1.5**	**1.2**	**0.8**	0.3	-0.2	**-0.6**	**-1.0**	**-1.3**	**-1.4**	**-1.4**	**-1.4**

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