A CDROM on the 1997 El Niño event in the western Pacific region

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This paper describes the content and possible uses of a CDROM produced as a pilot project by the National Climate Centre of the Bureau of Meteorology. The CDROM covers most of the 1997 calendar year, contains animated satellite imagery for the western Pacific region, as well as monthly anomaly maps and some impact information. Commentary from Bureau of Meteorology climatologists is also included. The CDROM should be useful for study of the evolution of the 1997 El Niño episode, for use in teaching, etc.

Introduction

The National Climate Centre of the Bureau of Meteorology is responsible for climate analysis and monitoring for Australia and adjacent regions of relevance to understanding the prevailing climatic state. It produces a range of hard copy monitoring publications and a wide range of climate information on the Bureau’s web page: METNET (http://www.bom.gov.au). The CDROM enclosed in this issue of Australian Meteorological Magazine is the first attempt to compile more extensive information in the very flexible and easily used and interrogated format of CDROM.

Production and objectives

The CDROM was produced during December 1997 and the first few weeks of January 1998, when the 1997-98 El Niño was close to its mature phase. Hence it is not a CDROM on the full El Niño episode, but rather, covers most of the 1997 calendar year and hence the precursor, onset and growth to mature phase of the episode. It was produced using commercially available software as an operational product of the National Climate Centre, and to accompany the Annual Climate Summary, a printed publication distributed widely in Australia and to overseas meteorological services.

The intention was not to produce an ‘infotainment’ CDROM or to target schools or the media. Instead, the intent was to produce a documentary record for purposes of study and/or understanding, by those who have a keen interest in the subject. The medium of a CDROM allows more detailed perusal of the evolution of the seasonal patterns and anomalies than is the case with a printed publication. It should also be noted that the new CDROM production packages available, while requiring a fairly steep learning curve, nevertheless allow the compilation of a large amount of information in a very accessible and attractive form in a very short time. The medium is thus very suitable for operational units such as the National Climate Centre.

The 1997-98 El Niño episode

This El Niño evolved into one the strongest events of the century in terms of its classical sea-surface temperature, tropical wind anomaly and tropical convection signatures. Its impacts were wide-ranging globally. A summary of some of the climate anomalies and impacts in the western Pacific region is shown in Fig. 1. Further information on the anomalies and impacts are available on the CDROM.
Fig. 1  A summary of some of the climate anomalies and impacts in the western Pacific region.

Some Climate highlights of 1997 in the Asia Pacific Basin

- Northeast China was dry over much of Winter and Spring.
- Record high rainfall was recorded in southeastern China and Hong Kong between January and August.
- In North Korea, flooding in 1996 was followed by a long period of drought beginning in September 1996, leaving the country in a state of desolation.
- Typhoon Winnie stirred the end of the Indian Monsoon causing heavy rainfall and flooding in south China and northern Philippines in August.
- Parts of India, Sri Lanka and Thailand experienced unusually low rainfall season, which had a delayed onset.
- Parts of southern India experienced heavy rainfall from June, causing extensive flooding.
- From March 6 - 25 Tropical Cyclone "Justin" caused extensive damage to the northeast coast of Australia and Papua New Guinea, an unusually northward movement. It is proposed the persistence of "Justin" contributed to the strength of the El Nino pattern.
- After a wet beginning, March saw the start of a very dry period in the southeastern Asian countries.
- Papua New Guinea experienced the "drought of the century", crippling industry and crops, hundreds died and up to a million facing starvation. A strong El Nino episode blamed.
- More than twice the annual Tropical Cyclone average was recorded in the South Pacific with formation concentrated unusually eastward.
- Except for relief rain in September most of eastern Australia experienced dry conditions from April, especially southern regions reducing crop yield.
- A colder year in New Zealand, with the exception of May, the fourth hottest on record.

Content and use of the CDROM

The CDROM has a number of sections, including animated twice-per-day satellite cloud photographs from the GMS5 satellite, courtesy of the Japanese Meteorological Agency. In addition, month-by-month anomalies of mean sea-level pressure (MSLP), upper and lower level wind and Australian rainfall are included. Commentary by Australian climatologists adds both information and interest.

Table 1 lists month by month some of the key features to note on the CDROM and also possible study questions.

Summary

The CDROM enclosed with this issue of the Australian Meteorological Magazine is an operational product. Consequently, it is not intended to provide a complete analysis of the 1997-98 El Niño episode. It is hoped that timely availability of information and analysis in this format will prompt more extensive study of the unusual features of the 1997-98 El Niño. Depending on user reactions, consideration will be given to producing an annual climate survey in this format. If readers have any technical difficulty with the CDROM, please consult the README file, which has helpful suggestions for computers with slightly different configurations.
<table>
<thead>
<tr>
<th>Month</th>
<th>General character of impacts</th>
<th>Features</th>
<th>Questions to ask</th>
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| Jan   | Asian-Australian monsoon active | * wet through tropics  
* strong Walker circulation from Indian Ocean to central Pacific | Is this typical pre-El Niño behaviour for the Indian Ocean? |
| Feb   | Wet | * sharp decrease in rainfall through large areas of Asia  
* Indonesia dry, Tropical Pacific wet from this month onwards  
* TC Justin  
* strong northerly wind anomalies in western Pacific north of TC Justin, strong cross-equatorial flow | Why?  
Why so early? |
| Mar   | Dry | Only very, very small SST anomaly on South American coast, at this time | |
| Apr   | Dry | * sharp declines in rainfall from 50N to 40S, right through Asia and Australia | Why, since El Niño signal in ocean is still relatively weak? |
| May   | Wet, especially in mid-latitudes | Tropical convection eastward of normal position | Was the intra-seasonal oscillation involved in the return to wetter conditions in mid-latitudes? |
| Jun   | Generally dry again | slow start to Indian Monsoon (IM) | Since this El Niño started early, why was IM so little affected? |
| Jul   | Mixed outside tropics | mid-months of IM close to normal | |
| Aug   | Mixed. Tendency for drier in southern hemisphere, wetter in northern hemisphere | dry NE China  
wet SE China | |
| Sep   | Mixed outside tropics | dry NE China  
wet SE China | Why was there good rainfall over Australia? |
| Oct   | Close to normal outside tropics | dry NE China  
wet SE China | |
| Nov   | Strong impacts continue in the tropics | more rain events over Australia | Why was southern Spring so atypical for El Niño? |
| Dec   | Strong impacts continue in the tropics | El Niño appears to be at mature phase | |