Chapter 2
Data

In this study, the monthly atmospheric variables are from the 40-year European Centre for Median-Range Weather Forecasts (ECWMF) Re-Analysis (ERA-40) (Uppala et al. 2005). The SST data is from the Hadley Centre Sea Ice and Sea Surface Temperature data set (HadISST) (Rayner et al. 2003), and the sea surface height (SSH), which is utilized as a proxy of upper-ocean heat content and thermocline depth, the ocean currents and the ocean temperature are from Simple Ocean Data Assimilation (SODA) version 2.0.2 (Carton et al. 2005). The ocean data assimilation product from the German Estimating the Circulation and Climate of the Ocean project (GECCO) (Köhl et al. 2006) is used for the oceanic mixed-layer heat budget analysis in Chap. 4. The GECCO serves as an appropriate dataset for ocean temperature budget analyses since no artificial internal sources and sinks of properties was adding when calculating the estimated state.

Regular El Niño events (excluding the three super El Niño cases) are defined as Niño-3 SST anomalies exceeding 0.5 standard deviation for at least 3 months. The time span covered by ERA-40 includes nine regular El Niño events (1963/1964, 1965/1966, 1968/1969, 1969/1970, 1976/1977, 1986/1987, 1987/1988, 1991/1992, and 1994/1995). An El Niño onset year is denoted by suffix (0), Y (0), and the year follows an El Niño event is denoted as Y (−1). Likewise, months in and before an El Niño onset year are also denoted by suffix (0), and (−1), respectively. For
example, October–November in the year before an El Niño event is abbreviated as ON (−1) and October–November in an El Niño year is abbreviated as ON (0).

Since the number of super El Niño is limited in the observation, the output of a coupled model, GFDL-ESM2M, is also used to investigate super El Niño with much more (12) events. The GFDL-ESM2M model output was obtained from the Coupled Model Intercomparison Project phase 5 (CMIP5) (Taylor et al. 2011) data archive (http://cmip-pcmdi.llnl.gov/cmip5/index.html). Simulated super El Niño in the preindustrial experiment for a 500 year simulation period was analyzed and compared to regular super El Niño in the model.

References


Super El Niño
Hong, L.-C.
2016, VIII, 68 p. 39 illus., 36 illus. in color., Hardcover
ISBN: 978-981-10-0526-8