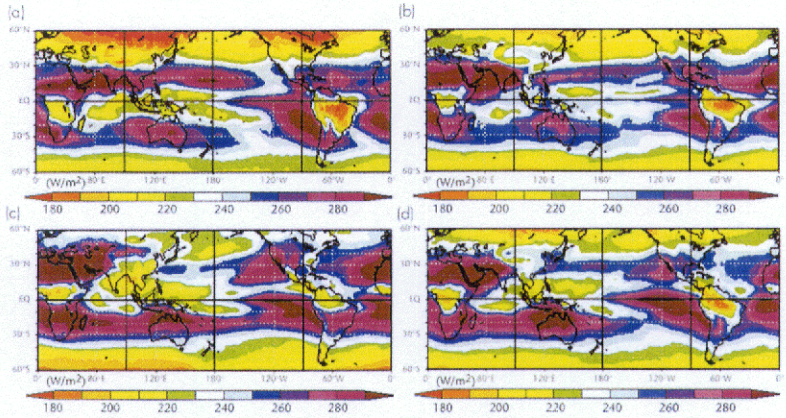

Figure A.8
Average outgoing longwave radiation (W/m²) across the Indo-Pacific region for a) January; b) July; c) April; and d) October. Areas less than 210 W/m² are shaded orange to red and in the tropics these regions indicate deep atmospheric convection. Areas shaded blue to purple have high values of outgoing longwave radiation, indicating relatively clear skies. (NOAA/CDC, USA from NCEP/NCAR reanalysis maps; after Meehl, 1987)

still experienced south of the equator over the Indian Ocean and as a weaker South Pacific convergence zone.

- Increased convection is experienced south of the equator over Africa and South America during October (Figure A.8d) in response to the southward shift of maximum solar heating. Active convection persists north of the equator over the eastern Indian Ocean and over the western Pacific Ocean across the Philippines, the South China Sea and into Indo-China.

Tropical regions of Africa and South America exhibit quite different regional characteristics of seasonal convection patterns to Asia and Australasia. Over Africa and South America, the region of deep tropical convection extends across the continent and moves north and south with the regularity of seasonal maximum solar heating. However, over the Indo-Pacific region, as the Asian summer monsoon (July) weakens during autumn (October), the region of deep tropical convection moves southeastward from the Asian continent to Indo-China and the equatorial western Pacific Ocean. By the Southern Hemisphere summer (January), the focus of deep tropical atmospheric convection is associated with the South Pacific convergence zone, a region of generally maximum sea surface temperature in the tropical western South Pacific. There is also a region of active deep tropical convection south of the equator over the Indian Ocean. The regions of tropical convection over the Southern Hemisphere oceans contract prior to the relatively rapid onset of the summer monsoon and deep atmospheric convection over the Asian continent.

The persisting tropical and subtropical dry zones, identified by high values of outgoing longwave radiation (the blue to mauve areas of Figure A.8), are important components of the atmospheric circulation because they are the descending regions of atmospheric overturning.

- There is a persisting, almost continuous band of descending air in the subtropics of the Southern Hemisphere. The band of descending air is broken by a period of convection as the active South Pacific convergence zone expands during the Southern Hemisphere summer (Figure A.8a).
- The subtropical band of descending air of the Northern Hemisphere is not as continuous as for the Southern Hemisphere. It is only during the northern winter that there is a degree of zonal continuity. Over Asia the descending air is replaced by convection during the summer monsoon period. However, descending air persists throughout the year in a band of the subtropics extending from the eastern Atlantic Ocean across Africa to the Middle East.
- Descending air is a persisting feature over the eastern Pacific Ocean, particularly south of the equator and in a persisting tongue that extends westward along the equator over the region of upwelling cold water.

The seasonal march of tropical deep atmospheric convection and the persisting regions of descending air are important characteristics of the annual cycle of the large-scale circulations and climate over the Indian and Pacific Oceans. The regions of deep atmospheric convection are where