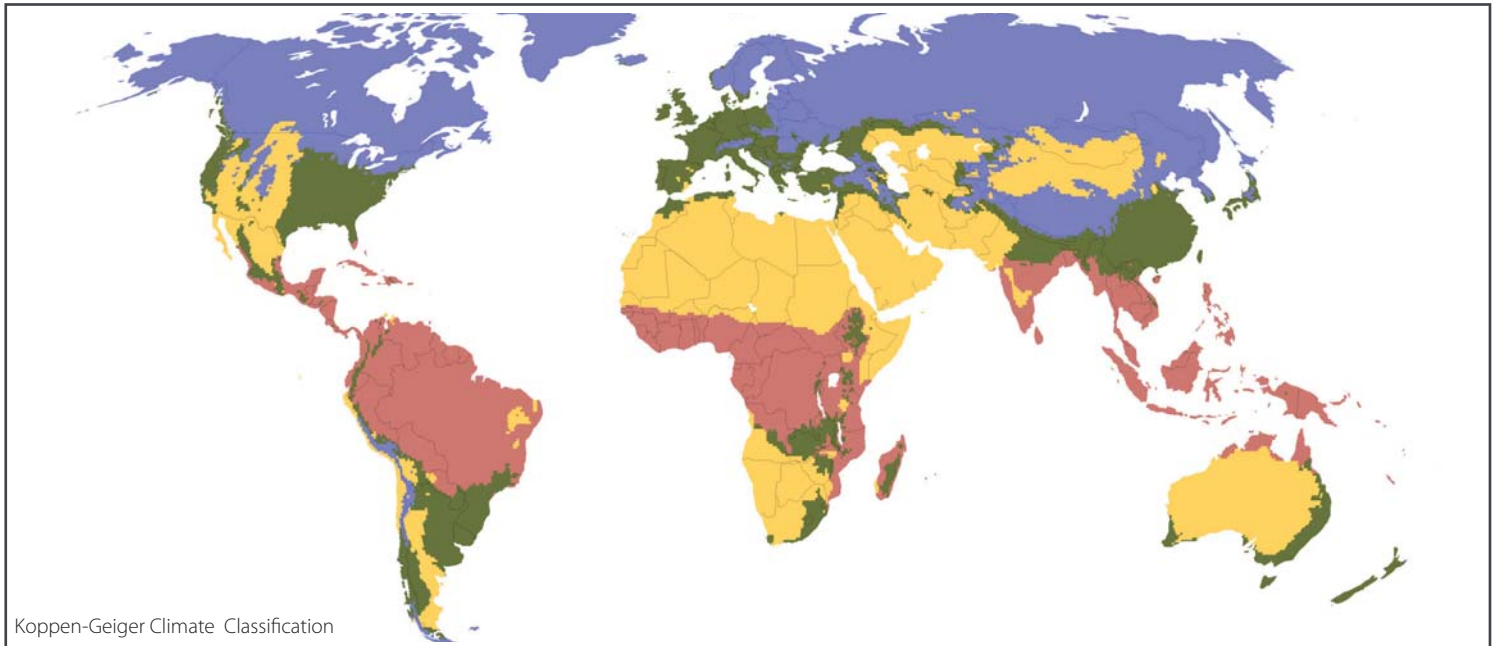




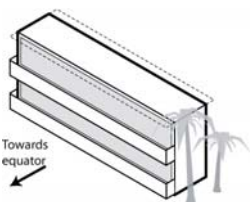
01: Designing in Different Climate Zones

Local climate conditions such as temperature, humidity, wind, rain and solar position and intensity should be considered in the early design stages. By tailoring passive design principles to the local environment, we can ensure that comfort levels are maintained throughout the year, while keeping energy bills and CO₂ emissions down.



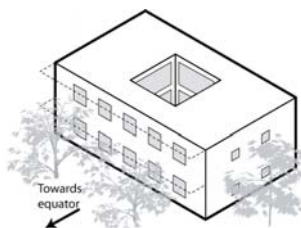
Hot and Humid

- Solar shading to reduce solar gains. Shallow horizontal shades on north and south facades (blocking 45-60° solar angles). Shutters / solar shades for east and west facades
- Lightweight structures that can be cooled quickly
- Light coloured, well insulated roofs to minimise solar heat gains (50-100mm rigid insulation)
- Possible ventilated roof space to further reduce heat gains
- High volume ventilation rates
- Cross flow ventilation utilizing local winds
- Protection from driving rain during storms
- Minimise east and west facades with long narrow building forms



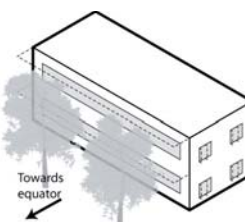
Hot and Dry

- Solar shading to reduce solar gains. Horizontal shades on facades that face the equator (blocking 50-70° solar angles). Vertical shades and shutters for east and west facades
- Compact form to reduce surface area and internal courtyards
- Light coloured, well insulated roofs to minimise solar heat gains (50-75mm rigid insulation)
- Possible ventilated roof space to further reduce heat gains
- Use exposed thermal mass (approx 50-100mm thickness) to utilise diurnal temperature variation
- Ventilation rates kept low during the day and increased over night
- Night purge ventilation
- Evaporative cooling features such as courtyard pools and vegetation



Temperate

- Solar shading to reduce solar gains in the summer but allow lower winter sun in (blocking 55-70° solar angles). Deep, horizontal shades on facades pointing towards the equator. Vertical shades on east and west facades. External shutters can also be useful
- Thermally massive buildings that can utilise the diurnal range (around 50mm exposed thermal mass)
- Well insulated fabric to minimise heat loss in winter and gains during the summer (minimum 100-150mm rigid insulation)
- Balconies and external protrusions used to shade walls
- Deciduous planting to provide seasonal shading



Cool

- Provide windbreaks for strong and prevailing winter winds
- Minimal solar shading unless equator-facing glazing risks summer overheating (blocking 60-70° solar angles)
- Allow winter sun to reach equator-facing windows
- High levels of thermal insulation (minimum of 150mm rigid insulation)
- Minimise surface to volume ratio with compact building form
- Use thermal mass for high occupancy and equipment use buildings
- Orientate openings towards the equator to make the most of solar gains

