A ocean data assimilation system is described based on the ensemble-based method and the application to the Indian Ocean and West Pacific. The ensemble optimal interpolation scheme with ensemble members from the model long-time integration is adopted. In view of the monsoon-dominated Indian ocean, the ensemble is updated with the season, rather than static. A different assimilation scheme of temperature and salinity profiles is used in the assimilation system due to the isopycnic model. The assimilation experiment combining the hybrid coordinate ocean model (HYCOM) with the resolution of 0.25°x0.25°x22 levels with various types of observations such as remotely-sensed sea surface temperature, temperature and salinity profiles from XBT, CTD, ARGO etc and altimetry data is carried out in the Indian Ocean and West Pacific from 1993 to 2006. The performance of the assimilation system is evaluated. The sea level variability are larger than other reanalysis products such as ECCO and SODA, and is closer to the independent observations. The ocean current shows an obvious improvement and is more similar to independent TAO observations. Additionally, the transport of Luzon strait agrees well with other studies. The transport of the Indonesian ThroughFlow (ITF) is also described and evaluated based on the observations and other products.