Evaluation

The LPJ simulations were evaluated on a local, regional and global scale using, among other things, the following data:

- AVHRR global data set at 1 km spatial resolution of percentage tree cover, and maps partitioning the woody vegetation according to phenology and leaf morphology (Defries et al.) [See figure].
- Observations of atmospheric CO_2 concentrations from a network of 27 monitoring stations from a programme of the NOAA.
- Monthly fluxes of CO_2 between the atmosphere and the ocean surface were obtained from a standard run of Hamburg Model of the Ocean Carbon Cycle (HAMOCC3).
- Monthly CO_2 emissions fields from fossil-fuel burning and cement manufacture were computed based on a global $1° \times 1°$ map compiled by Marland et al. (1989).
- Reduced-form "station matrices" were derived from the TM2 atmospheric tracer transport model.
- A global $1° \times 1°$ data set of annual runoff was used.
- Measurements of meteorological data and fluxes of net ecosystem exchange (NEE) were obtained for six sites from EUROFLUX monitoring network.
- Soil moisture data available from a variety of literature sources.

The general pattern– with maximum needleleaf evergreen dominance in the "core" area falling off to the north and south – is, compared to a satellite-derived data set, shown correctly.

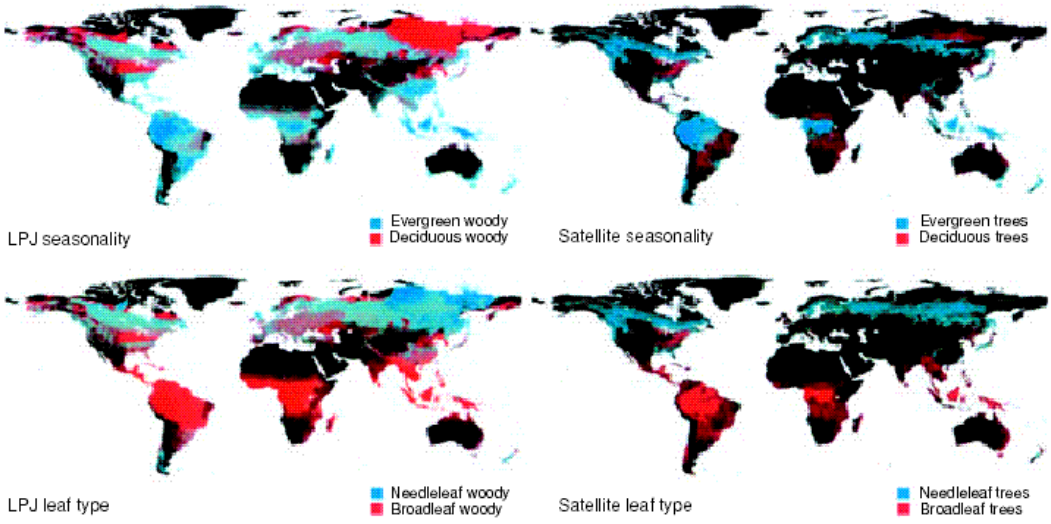

Figure: Comparison of LPJ-simulated distributions of woody vegetation with satellite-based maps, for percentage tree cover, partitioned according to phenology and leaf morphology

Comparison of simulated and satellite-derived leaf phenology and leaf type also confirms that the transition along precipitation gradients in the tropics and subtropics – from desert, through broadleaved deciduous forests or savannas to broadleaved evergreen forests – are represented reasonably well by LPJ.