Australia's climate: Drought and flooding in annual rings of tropical trees

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Annual rings are acclaimed in representing natural climate archives. For the temperate latitudes it is known that the growth of these annual rings depend mainly on temperature and precipitation. In the tropics, however, with only slight seasonal variations, the correlation is not so evident. Now scientists of the GFZ German Research Centre for Geosciences and their colleagues of the Australian National University have been able to prove that tree growth in north-east Australia depends mainly on the annual precipitation.

Furthermore, in the recent edition of the journal "*Climate Dynamics*" they showed that growth rings are most suitable as climate proxy data for the registration of the precipitation dynamics in Australia.

Australia is periodically influenced by the climate fluctuations ENSO (El Niño Southern Oscillation) and, thus, regularly afflicted by strong periods of drought with bush fires and flooding due to extremely strong rain fall. In order to more precisely investigate the, for the Australians so important, precipitation fluctuations of the past centuries, scientists working with Ingo Heinrich of the GFZ, a member Institute of the Helmholtz-Association, examined tropical trees from the remote highland rain forests of Australia. The analysis lead to one of the few existing annual ring chronologies from tropical rain forests worldwide. "Our time line actually represents the first ever growth ring chronology in tropical Australia", says Ingo Heinrich.

To date the seasonal climate forecast for Australia has been based on

calculations of the fluctuations of the indexes of ENSO or of the Interdecadal Pacific Oscillation (IPO), a method that, however, has not always proven to be reliable. "Through multiple correlation analysis we were now able to prove that the growth rings provide the better proxy data in comparison to ENSO or IPO with respect to precipitation dynamics", adds Ingo Heinrich.

In further steps at additional locations and through a combination with coral proxy data the scientists aim to accomplish considerable progress in the development of reliable climate forecasting from such growth rings.

Source: Helmholtz Association of German Research Centres (news : web)