

LIST OF FIGURES

Fig.1.1	Schematic diagram showing effect of the amount effect and relative humidity on δ^{18} O of cellulose	17
Fig.2.1	Locations of the teak tree samples and IMD/GNIP stations	23
Fig.2.2a	Climatology of Mumbai	24
Fig.2.2b	Climatology of Jagdalpur	25
Fig.2.2c	Climatology of Hanamkonda	25
Fig.2.2d	Climatology of Palakkad	26
Fig.2.3	Monthly rainfall δ^{18} O values for various stations in central India for year 1977	28
Fig.2.4	Yearly rainfall and weighted annual rainfall $\delta^{18}O$ observed at Kozhikode	29
Fig.2.5	Relation between monthly rainfall and amount weighted monthly $\delta^{18}O$ observed at Kozhikode	29
Fig.2.6	Mean monthly rainfall δ^{18} O values observed at Kozhikode based on observations from year 1997 to 2004 A.D.	30
Fig.2.7	Flow chart showing the experimental procedure followed in the present study	32
Fig.2. 8	Ring porous vesicle structure observed in the teak samples	32
Fig.2.9	Photograph of a ring subdivided into 8 parts for studying sub-annual $\delta^{18}O$ variations	33
Fig.2.10	Representative FTIR spectra of α -cellulose extracted using present method, Brendel et al., (2000)'s method and commercial available α -cellulose of Sigma Aldrich	36
Fig.2.11	Scatter plot showing δ^{18} O values of all the ANU sucrose standards measured along with cellulose samples in the present work	39

	Fig.3.1	A photograph depicting a ring which was divided into four parts	43
	Fig.3.2	Coarse resolution sub-annual cellulose δ^{18} O profiles observed for teak trees from area near Jagdalpur (Jag03 and Jag04) and Hanamkonda (AP1)	47
	Fig.3.3	Fine resolution sub-annual cellulose δ^{18} O profiles observed for teak trees from area near Jagdalpur (Jag03) and Hanamkonda (AP1)	48
	Fig. 3.4	Sub-annual cellulose δ^{18} O profiles of the rings of the teak from Perambikulam (PKLM)	49
	Fig.3.5	Sub-annual cellulose δ^{18} O variation observed in one of the ring (year 1971 A.D.) of teak from Jagdalpur (Jag03) and corresponding modeled cellulose δ^{18} O profile	50
	Fig. 3.6	Modeled climatological cellulose δ^{18} O profile considering constant and varying δ^{18} O of rainwater	55
	Fig.4.1	Time series of ring-width variations of all the samples	62
	Fig.4.2	Time series of ring-widths and ring-width indices of Jag03 and Jag04	63
	Fig.4.3	Time series of ring-widths and ring-width indices of AP1 and AP2	63
	Fig.4.4	Time series of ring-widths and ring-width indices of the sample from Kerala, PKLM	64
	Fig.4.5	Time series of cellulose δ^{18} O variations of the sample from Thane, THN	64
	Fig.4.6	Time series of cellulose δ^{18} O variations of the samples from Jagdalpur, Jag03 and Jag04	65
	Fig.4.7	Time series of cellulose δ^{18} O variations of sample AP1, from Andhra Pradesh	65
	Fig.4.8	Time series of cellulose δ^{18} O variations of sample AP2, from Andhra Pradesh	66
÷	Fig.4.9	Time series of cellulose δ^{18} O variations of the sample from Kerala, PKLM	66

Fig.4.10	Comparison of percentage rainfall anomaly and cellulose δ^{18} O record of sample THN	74
Fig.4.11	Comparison of cellulose δ^{18} O record of Jag03 and Chattisgarh sub-divisional rainfall	75
Fig.4.12	Yearly rainfall of Palakkad and cellulose δ^{18} O record of sample from southern India, PKLM	77
Fig.4.13	Comparison between PKLM cellulose δ^{18} O record and Kerala sub-divisional rainfall	77
Fig.4.14	Reconstructed past rainfall for Perambikulam region using cellulose δ^{18} O record of PKLM and available instrumental rainfall record for the south peninsular India	80

\$ S



LIST OF TABLES

Table 2.1	Monthly δ^{18} O of rainfall for the locations near to the sample locations	27
Table 2.2	Names and locations of the samples collected in the present study and time spans covered by them	30
Table 2.3	Standard deviations of δ^{18} O measurements of ANU sucrose samples measured during various runs	38
Table 3.1	Correlation coefficients among monthly rainfall, monthly relative humidity and monthly number of rainy days at Jagdalpur	52
Table 4.1	Statistics of ring-width, ring-width index and cellulose δ^{18} O variations of trees selected in the present study	61
Table 4.2	Common signal in ring-widths, ring-width indices and cellulose δ^{18} O between Jag03 and Jag04	69