NPP Multi-Biome: Global IBP Woodlands Data, 1955-1975, R1

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Revision date: September 13, 2013

Summary:

This data set provides four data files containing net primary productivity (NPP) data, edaphic characteristics, average climatic conditions, and basic descriptive and quantitative information on vegetation for 117 globally-distributed terrestrial forest sites. The data set was derived from the IBP (International Biological Programme) Woodlands Data Set of DeAngelis et al. (1981). The data were collected from the mid 1950s to the early 1970s and were compiled into an electronic data set at the Oak Ridge National Laboratory to facilitate comparisons involving the diverse woodland ecosystems.

One data file provides a complete synthesis of NPP, vegetation, edaphic, and climate data and data-source references for each of the 117 sites as published in DeAngelis et al. (1981) for a total of 5,887 records. The second file provides site location, biome, and selected forest productivity and soils data for the 117 sites. The third file provides summary climate data (temperature, precipitation, radiation, growing season length) for each site, and the fourth file provides forest type, investigator(s), and years of the study for each site.

Revision Notes: Only the documentation for this data set has been modified. The data files have been checked for accuracy and are identical to those originally archived in 1997 (DeAngelis, et al, 1997.)

Additional Documentation:

The Net Primary Productivity (NPP) data collection contains field measurements of biomass, estimated NPP, and climate data for terrestrial grassland, tropical forest, boreal forest, and tundra sites worldwide. Data were compiled from the published literature for intensively studied and well-documented individual field sites and from a number of previously compiled multi-site, multi-biome data sets of georeferenced NPP estimates. The principal compilation effort (Olson et al., 2001) was sponsored by the NASA Terrestrial Ecology Program. For more information, please visit the NPP web site at http://daac.ornl.gov/NPP/npp_home.html.

Data Citation:

Cite this data set as follows:

DeAngelis, D.L., R.H. Gardner, and H.H. Shugart. 2013. NPP Multi-Biome: Global IBP Woodlands Data, 1955-1975, R1. Data set. Available on-line [http://daac.ornl.gov] from Oak Ridge National Laboratory Distributed Active Archive Center, Oak Ridge, Tennessee, USA. doi:10.3334/ORNLDAAC/198

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DeAngelis, D.L., R.H. Gardner, and H.H. Shugart. 1997. NPP Multi-Biome: Global IBP Woodlands Data, 1955-1975. Data set. Available on-line [http://daac.ornl.gov] from Oak Ridge National Laboratory Distributed Active Archive Center, Oak Ridge, Tennessee, USA.

Table of Contents:

1. Data Set Overview:

Project: Net Primary Productivity (NPP)

The IBP (International Biological Programme) Woodlands Data Set contains contributions from 117 international forest research sites, all but a few associated with projects committed to the IBP. The field measurements data were collected from the mid-1950s to the mid-1970s. The data were compiled into a single data set at the Oak Ridge National Laboratory (ORNL) to facilitate comparisons involving the diverse woodland ecosystems. The data set was originally published in DeAngelis et al. (1981) and was extracted from that reference to be presented here.

This data set provides four data files containing net primary productivity (NPP) data, edaphic characteristics, average climatic conditions, and basic descriptive and quantitative information on vegetation for 117 globally-distributed terrestrial forest sites. The data set was derived from the IBP (International Biological Programme) Woodlands Data Set of DeAngelis et al. (1981). The data were collected from the mid 1950s to the early 1970s and were compiled into an electronic data set at the Oak Ridge National Laboratory to facilitate comparisons involving the diverse woodland ecosystems.

Table 1. Summary of biological and environmental parameters for sites included in the IBP Woodlands Data Set by forest type (with forest abbreviation used in the data set).

	Forest Type				
	Mediteranean Broad-leaved [Evergreen (MeBLE) and Deciduous (MeBLD)]	**Tropical Broad-leaved Evergreen (TrBLE)**	**Tropical Broad-leaved Deciduous (TrBLD)**	**Tropical Broad-leaved Deciduous Plantation (TrBLD/P)**	**Temperate Broad-leaved Evergreen (TeBLE)**
No. of sites	3	4	2	14	1
Stand age (range, yr)	51-150	mature	60-120	5-40	55
Basal area (m^2/ha)	41.3 ± 8.7	29.8 ± 0.8	26.3 ± 4.3	29.4 ± 3.6	47.9
Height (m)	17.1 ± 4.3	37.8 ± 0.3	13.8 ± 2.2	14.3 ± 1.0	12.0
Leaf area index (m^2/m^2)	4.3 ± 0.2	na	na	9.2 ± 0.8	6.0
Leaf biomass (g/m^2)	694 ± 6	na	na	834 ± 112	770
Branch and bole biomass (g/m^2)	27,825 ± 1,625	37,126 ± 1,749	16,494 ± 2,324	14,366 ± 2,539	18,558
Branch and bole increment (g/m^2/yr)	na	na	747 ± 63	1,009 ± 140	983
Above-ground standing crop (g/m^2)	28,753 ± 1,759	43,266 ± 3,111	17,200 ± 2,404	15,200 ± 2,581	19,328.5
Net primary production (g/m^2/yr)	748 ± 104	1,549 ± 44	1,304 ± 194	1,631 ± 184	1,368
Total litterfall (g)	370 ± 14	na	639 ± 39	na	na
Total leaffall (g)	217 ± 28	654 ± 94	496 ± 70	639 ± 82	385
Below-ground standing crop (g/m^2)	na	na	2,908 ± 360	3,459 ± 545	na
Soil top organic matter (g/m^2)	1,485 ± 342	na	na	719 ± 89	809
Average annual temperature (C)	12.9 ± 0.9	26.5 ± 0.4	na	27.5	21.5
Average annual precipitation (mm)	908 ± 77	1,851 ± 82	1,058 ± 214	1,158	2,630
Length of growing seaon	365	365	194 ± 76	na	365

(days)					
Growing season temperature (C)	12.9 ± 0.9	26.5 ± 0.4	na	na	21.5
Growing season precipitation (mm)	908 ± 77	1,851 ± 82	na	na	2,630

Table 1. Continued

Forest Type

	Temperate Needle-leaved Deciduous Plantation (TeNLD/P)	Temperate Needle-leaved Evergreen (TeNLE)M	Temperate Evergreen Plantation [Needle-leaved (TeNLE/P) and Broad-leaved (TeBLE/P)]	Temperate Broad-leaved Deciduous (TeBLD)	Boreal Needle-leaved Evergreen (BoNLE)	Boreal Needle-leaved Evergreen Plantation (BoNLE/P)
No. of sites	1	5	5	19	9	5
Stand age (range, yr)	39	85-290	15-36	30-200	51-130	34-115
Basal area (m^2/ha)	37.3	68.8 ± 9	34.5 ± 5.3	23.7 ± 1.1	32.8 ± 1.7	46.2 ± 4.5
Height (m)	19.4	21.0 ± 2	15.0 ± 1.4	20.8 ± 1.4	17.2 ± 17	25.8 ± 2.4
Leaf area index (m^2/m^2)	6.7	8.8 ± 1	na	5.2 ± 0.3	7.6 ± 0.4	na
Leaf biomass (g/m^2)	359	932 ± 213	647 ± 90	350 ± 29	964 ± 90	1,371 ± 281
Branch and bole biomass (g/m^2)	16,080	22,496 ± 5,490	11,249 ± 1,647	16,249 ± 2,562	12,443 ± 1,876	23,081 ± 3,083
Branch and bole increment (g/m^2/yr)	580	382 ± 74	743 ± 144	359 ± 36	135 ± 29	699 ± 108
Above-ground standing crop (g/m^2)	16,938	21,437 ± 4,000	11,918 ± 1,732	17,352 ± 2,235	13,917 ± 1,869	24,452 ± 2,930
Net primary production (g/m^2/yr)	939	1,159 ± 236	1,249 ± 157	918 ± 74	516 ± 60	1,128 ± 177
Total litterfall (g)	na	408 ± 29	578 ± 106	528 ± 58	349 ± 60	na
Total leaffall (g)	359	201 ± 18	348 ± 66	342 ± 13	230 ± 42	344 ± 32
Below-ground standing crop (g/m^2)	3,794	na	3,116 ± 319	3,799 ± 451	3,810 ± 551	6,005 ± 917
Soil top organic matter (g/m^2)	1,390	na	na	757 ± 169	3,776 ± 798	na
Average annual temperature (C)	16.2	6.1 ± 1.9	13.6 ± 1.1	9.9 ± 0.8	0.25 ± 1.56	6.6 ± 0.4
Average annual precipitation (mm)	1,806	935 ± 270	1,338 ± 89	917 ± 115	514 ± 89	913 ± 78

Length of growing seaon (days)	150	196 ± 8	201 ± 16	198 ± 14	106 ± 20	186 ± 29
Growing season temperature (C)	na	11.6 ± 0.04	18.4 ± 1.2	15.0 ± 1.0	13.0 ± 0.6	13.4 ± 0.8
Growing season precipitation (mm)	na	639 ± 142	690 ± 31	499 ± 81	264 ± 60	452 ± 54

Notes: na = not available. Unless otherwise indicated, values are means and standard errors are based on the number of stands included.

2. Data Description:

This data set contains four data files containing net primary productivity (NPP) data, edaphic characteristics, average climatic conditions, and basic descriptive and quantitative information on vegetation for 117 globally-distributed terrestrial forest sites.

Spatial Coverage

Site: Global

Site Boundaries:(All latitude and longitude given in decimal degrees)

Site (Region)	Westernmost Longitude	Easternmost Longitude	Northernmost Latitude	Southernmost Latitude	Elevation (m)
Global	-148	145.1667	66.3667	-37.4167	-22 - 2,000

Site Information

Almost every kind of forest ecosystem is represented in the data set (Burgess, 1981). A hierarchical scheme was used to assign a forest type to each site based on the climate, life-form, behavior, and status features of the site. Included are sites of the following types, with the number of each forest type in parentheses: Tropical (26), Mediterranean (3), Temperate (55), and Boreal (33). With respect to life-form, 72 sites were dominated by broad-leaved species and 45 were needle-leaved. There were 65 deciduous stands and 52 evergreen. Finally, 89 sites consisted of natural forest and 28 were managed. Overall, the sites were classified by biome, as shown in Table 2. There is a reasonable representation of all terrestrial forest categories with the exception of Mediterranean woodlands, which are under-represented.

Table 2. Site names, locations, climate information, and forest classifications in the IBP Woodlands Data Set

ID	SITE	LONG (decimal degrees)	LAT (decimal degrees)	MAT (C)	MAP (mm)	BIOME CLASSIFICATION
1	MT DISAPPOINTMENT, AUSTRALIA	145.1667	-37.4167	11.2	982	MeBLE
2	VIRELLES, BELGIUM	4.35	50.0667	8.5	952	TeBLD
3	MANAUS, BRAZIL	-60	-4	27.2	1771	TrBLE
4	ONTARIO SITE REGION 5, SITE 1 (DRY), CANADA	-78.3833	45.2333	4	1243	BoNLE
5	ONTARIO SITE REGION 5, SITE 2 (FRESH), CANADA	-78.8167	45.5333	4	1243	BoNLE
6	ONTARIO SITE REGION 5, SITE 3 (MOIST), CANADA	-78.2833	45.2833	4	1243	BoNLE
7	ONTARIO SITE REGION 5, SITE 4 (WET), CANADA	-78.2667	45.2833	4	1243	BoNLE
8	BAB, CZECHOSLOVAKIA	17.9	48.1833	10	570	TeBLD
9	HESTEHAVEN, DENMARK	10.4833	56.3	7.1	660	TeBLD
10	OULU, FINLAND	29	66.3667	0	500	BoNLE
11	FONTAINEBLEAU, FRANCE	2.6333	48.4167	10.2	674	TeBLD
12	MADELEINE, FRANCE	4	43	14.1	754	MeBLD
13	ROUQUET, FRANCE	3.7667	43.7	12.4	987	MeBLD

14	SIKFOKUT, HUNGARY	20.4667	47.9	9.9	582	TeBLD
15	CHAKIA FOREST (SITE 1), VARANASI, INDIA	83.0333	25	-99.9	-9999	TrBLD
16	CHAKIA FOREST (SITE 2), VARANASI, INDIA	83	25	30.1	742	TrBLD
17	CHAKIA, INDIA	83	25.3333	-99.9	844	TrBLD
18	SAL PLANTATION (5 YR OLD), GORAKHPUR FOREST DIVISION, INDIA	83.8833	27	-99.9	-9999	TrBLD/P
19	SAL PLANTATION (8 YR OLD), GORAKHPUR FOREST DIVISION, INDIA	83.8833	27	-99.9	-9999	TrBLD/P
20	SAL PLANTATION (14 YR OLD), GORAKHPUR FOREST DIVISION, INDIA	83.8833	27	-99.9	-9999	TrBLD/P
21	SAL PLANTATION (26 YR OLD), GORAKHPUR FOREST DIVISION, INDIA	83.8833	27	-99.9	-9999	TrBLD/P
22	SAL PLANTATION (30 YR OLD), GORAKHPUR FOREST DIVISION, INDIA	83.8833	27	-99.9	-9999	TrBLD/P
23	SAL PLANTATION (40 YR OLD), GORAKHPUR FOREST DIVISION, INDIA	83.8833	27	-99.9	-9999	TrBLD/P
24	TEAK PLANTATION (5 YR OLD), GORAKHPUR FOREST DIVISION, INDIA	83.8833	27	-99.9	-9999	TrBLD/P
25	TEAK PLANTATION (8 YR OLD), GORAKHPUR FOREST DIVISION, INDIA	83.8833	27	-99.9	-9999	TrBLD/P
26	TEAK PLANTATION (14 YR OLD), GORAKHPUR FOREST DIVISION, INDIA	83.8833	27	-99.9	-9999	TrBLD/P
27	TEAK PLANTATION (26 YR OLD), GORAKHPUR FOREST DIVISION, INDIA	83.8833	27	-99.9	-9999	TrBLD/P
28	TEAK PLANTATION (30 YR OLD), GORAKHPUR FOREST DIVISION, INDIA	83.8833	27	-99.9	-9999	TrBLD/P
29	TEAK PLANTATION (40 YR OLD), GORAKHPUR FOREST DIVISION, INDIA	83.8833	27	-99.9	-9999	TrBLD/P
30	SAL PLANTATION (10 YR OLD), LACCHMIPUR RANGE, GORAKHPUR FOREST DIVISION, INDIA	83.5	27	27.5	1158	TrBLD/P
31	SAL PLANTATION (16 YR OLD), LACCHMIPUR RANGE, GORAKHPUR FOREST DIVISION, INDIA	83.5	27	27.5	1158	TrBLD/P
32	SAL PLANTATION (22 YR OLD), LACCHMIPUR RANGE, GORAKHPUR FOREST DIVISION, INDIA	83.5	27	27.5	1158	TrBLD/P
33	SAL PLANTATION (28 YR OLD), LACCHMIPUR RANGE, GORAKHPUR FOREST DIVISION, INDIA	83.5	27	27.5	1158	TrBLD/P
34	SAL PLANTATION (35 YR OLD), LACCHMIPUR RANGE, GORAKHPUR FOREST DIVISION, INDIA	83.5	27	27.5	1158	TrBLD/P
	SAL PLANTATION (38 YR OLD), LACCHMIPUR RANGE,					

35	GORAKHPUR FOREST DIVISION, INDIA	83.5	27	27.5	1158	TrBLD/P
36	BANCO (PLATEAU), IVORY COAST	-4.0333	5.3833	26.2	2095	TrBLE
37	YAPO, IVORY COAST	-4.1	5.7	-99.9	1739	TrBLE
38	JPTF-66-KOIWAI, KOIWAI, JAPAN	141	39.75	10.2	1806	TeNLD/P
39	SCHOOL FOREST, ASHU, KYOTO, JAPAN	135.75	35.3333	11.3	2788	TeBLD
40	OKINAWA, JAPAN	128.0833	26.7833	21.5	2630	TeBLE
41	JPTF-OKITA, OKITA, JAPAN	141.35	39.0333	11.3	1467	TeNLE
42	SHIGAYAMA, JAPAN	138.5	36.6667	4.2	1455	TeNLE
43	JPTF-70 YUSUHARA KUBOTANIYAMA, JAPAN	133	33.3333	13.6	2748	TeNLE
44	JPTF-71 YUSUHARA TAKATORIYAMA, JAPAN	133	33.3333	13.6	2748	TeNLE
45	PASOH, WEST MALAYSIA	102.3	2.9833	26	1800	TrBLE
46	MEERDINK, NETHERLANDS	6.7	51.9167	8.6	780	TeBLD
47	GEOBOTANICAL STATION, BIALOWIEZA, POLAND	23.8667	52.75	5.3	649	TeBLD
48	ISPINA, NIEPOLOMICE NEAR KRAKOW, POLAND	20.3667	50.1	7.8	729	TeBLD
49	KAMPINOS NATIONAL PARK, POLAND	20.8333	52.3333	-99.9	548	TeNLE
50	BABADAG, SITE 1, RUMANIA	28.7167	44.9	10.6	480	TeBLD
51	BABADAG, SITE 2, RUMANIA	28.7167	44.9	10.2	500	TeBLD
52	SINAIA, SITE 1, RUMANIA	23.25	45.3833	5.7	895	TeBLD
53	SINAIA, SITE 2, RUMANIA	23.25	45.3833	5.1	1025	TeNLE
54	SAN JUAN, SPAIN	-0.65	42.5	8	802	TeNLE
55	ANDERSBY ANGSBACKAR III, SWEDEN	17	60	5.5	566	TeBLD
56	KONGALUND BEECH SITE, SWEDEN	13.1667	55.9833	7	800	TeBLD
57	KONGALUND SPRUCE SITE, SWEDEN	13.1667	55.9833	7	800	BoNLE/P
58	LANGAROD, SWEDEN	13.9167	55.75	6	900	TeBLD
59	OVED, SWEDEN	13.6333	55.7	7	650	TeBLD
60	LINNEBJER, SWEDEN	13.3	55.7333	7	644	TeBLD
61	KOINAS, ARKANGELSK REGION, USSR	47.5	64.6667	-1.2	499	BoNLE
62	CAUCASUS BIRCH SITE 1, AZERBAIJAN, USSR	48	41	-99.9	450	TeBLD
63	CAUCASUS BIRCH SITE 2, AZERBAIJAN, USSR	48	41	-99.9	450	TeBLD
64	TALLISH IRONWOOD (SUBTROPICAL) SITE 1, AZERBAIJAN, USSR	48.5	38.8333	10	1200	TeBLD
65	TALLISH IRONWOOD (SUBTROPICAL) SITE 2, AZERBAIJAN, USSR	48.5	38.8333	10	1200	TeBLD
66	TALLISH IRONWOOD (SUBTROPICAL) SITE 3, AZERBAIJAN, USSR	48.5	38.8333	10	1200	TeBLD
67	TALLISH IRONWOOD (SUBTROPICAL) SITE 4, AZERBAIJAN, USSR	48.5	38.8333	10	1200	TeBLD
68	TALLISH OAK (SUBTROPICAL) SITE 1, AZERBAIJAN, USSR	48.5167	38.8333	10	700	TeBLD
	TALLISH OAK (SUBTROPICAL)					

69	SITE 2, AZERBAIJAN, USSR	48.5	38.6667	15	1350	TeBLD
70	LES NA VORSKLE, PLOT 7, BELGOROD REGION, USSR	35.9667	50.6333	6	537	TeBLD
71	LES NA VORSKLE, PLOT 8, BELGOROD REGION, USSR	35.9667	50.6333	6	537	TeBLD
72	CENTRAL FOREST RESERVE, USSR	32.6667	56.5	3.4	640	BoNLE
73	SOUTHERN KARELIAN SPRUCE, SITE 1, KARELIA, USSR	34	62	2.2	650	BoNLE
74	SOUTHERN KARELIAN SPRUCE, SITE 2, KARELIA, USSR	34	62	2.2	650	BoNLE
75	SOUTHERN KARELIAN SPRUCE, SITE 3, KARELIA, USSR	34	62	2.2	650	BoNLE
76	SOUTHERN KARELIAN SPRUCE, SITE 4, KARELIA, USSR	34	62	2.2	650	BoNLE
77	SOUTHERN KARELIAN SPRUCE, SITE 5, KARELIA, USSR	34	62	2.2	650	BoNLE
78	SOUTHERN KARELIAN SPRUCE, SITE 6, KARELIA, USSR	34	62	2.2	650	BoNLE
79	SOUTHERN KARELIAN SPRUCE, SITE 7, KARELIA, USSR	34	62	2.2	650	BoNLE
80	SOUTHERN KARELIAN SPRUCE, SITE 8, KARELIA, USSR	34	62	2.2	650	BoNLE
81	SOUTHERN KARELIAN SPRUCE, SITE 9, KARELIA, USSR	34	62	2.2	650	BoNLE
82	SOUTHERN KARELIAN SPRUCE, SITE 10, KARELIA, USSR	34	62	2.2	650	BoNLE
83	SOUTHERN KARELIAN SPRUCE, SITE 11, KARELIA, USSR	34	62	2.2	650	BoNLE
84	SOUTHERN KARELIAN SPRUCE, SITE 12, KARELIA, USSR	34	62	2.2	650	BoNLE
85	SOUTHERN KARELIAN SPRUCE, SITE 13, KARELIA, USSR	34	62	2.2	650	BoNLE
86	SOUTHERN KARELIAN SPRUCE, SITE 14, KARELIA, USSR	34	62	2.2	650	BoNLE
87	SOUTHERN KARELIAN SPRUCE, SITE 15, KARELIA, USSR	34	62	2.2	650	BoNLE
88	SOUTHERN KARELIAN SPRUCE, SITE 16, KARELIA, USSR	34	62	2.2	650	BoNLE
89	SOUTHERN KARELIAN SPRUCE, SITE 17, KARELIA, USSR	34	62	2.2	650	BoNLE
90	TIGROVAYA FLOODPLAIN, CENTRAL ASIA, TADJIKISTAN, USSR	68.5	37.3333	17.3	186	TeBLD
91	MEATHOP WOOD, UNITED KINGDOM	-2.8917	54.2083	7.8	1115	TeBLD

92	BLACK SPRUCE-FEATHER MOSS SITE, ALASKA, USA	-148	64	-99.9	-9999	BoNLE
93	BLACK SPRUCE MUSKEG, SITE 1, ALASKA, USA	-148	64	-3.4	269	BoNLE
94	BLACK SPRUCE MUSKEG, SITE 2, ALASKA, USA	-148	64	-3.4	287	BoNLE
95	HUBBARD BROOK, NEW HAMPSHIRE, USA	-71.5	44	-99.9	1250	TeBLD
96	BROOKHAVEN, NEW YORK, USA	-72.9	40.8333	9.8	1240	TeBLD
97	WATERSHED 1, COWEETA, NORTH CAROLINA, USA	-83.4333	35.0667	13.6	1628	TeNLD/P
98	WATERSHED 18, COWEETA, NORTH CAROLINA, USA	-83.4333	35.05	12.6	1945	TeBLD
99	DUKE FOREST, NORTH CAROLINA, USA	-79	36	15.6	1150	TeBLE/P
100	TRIANGLE SITE, SAXAPAHAW, NORTH CAROLINA, USA	-79	36	15.6	1150	TeBLE/P
101	ANDREWS EXPERIMENTAL FOREST, WATERSHED 10, OREGON, USA	-122.3333	44.25	8.5	2250	TeNLE
102	LIRIODENDRON SITE OAK RIDGE, TENNESSEE, USA	-84.2833	35.9167	13.3	1400	TeBLD
103	WALKER BRANCH SITE 1, OAK RIDGE, TENNESSEE, USA	-84.2833	35.9667	13.3	1400	TeBLD
104	WALKER BRANCH SITE 2, OAK RIDGE, TENNESSEE, USA	-84.2833	35.9667	13.3	1400	TeBLD
105	WALKER BRANCH SITE 3, OAK RIDGE, TENNESSEE, USA	-84.2833	35.9667	13.3	1400	TeBLD
106	WALKER BRANCH SITE 4, OAK RIDGE, TENNESSEE, USA	-84.2833	35.9667	13.3	1400	TeBLD
107	THOMPSON RESEARCH CENTER, SEATTLE, WASHINGTON, USA	-121.95	47.3833	9.8	1360	TeNLE/P
108	NOE WOODS (LAKE WINGRA), WISCONSIN, USA	-89.4	43.0333	6.9	777	TeBLD
109	NAKOMA URBAN FOREST, WISCONSIN, USA	-89.4	43.0333	-99.9	-9999	TeBLD
110	FA. EGLHARTING, ABT. 27A, FEDERAL REPUBLIC OF GERMANY	12	48	7	875	BoNLE/P
111	SOLLING PROJECT, SITE B 1, FEDERAL REPUBLIC OF GERMANY	9.5833	51.8167	6.1	1063	TeBLD
112	SOLLING PROJECT, SITE B 3, FEDERAL REPUBLIC OF GERMANY	9.5667	51.75	6.1	1063	TeBLD
113	SOLLING PROJECT, SITE B 4, FEDERAL REPUBLIC OF GERMANY	9.6	51.75	6.3	1063	TeBLD
114	SOLLING PROJECT, SITE F 1, FEDERAL REPUBLIC OF GERMANY	9.5833	51.8167	5.9	1063	BoNLE/P
115	SOLLING PROJECT, SITE F 2, FEDERAL REPUBLIC OF GERMANY	9.5667	51.7333	5.9	1063	BoNLE/P
116	SOLLING PROJECT, SITE F 3, FEDERAL REPUBLIC OF	9.5833	51.75	5.9	1063	BoNLE/P

	GERMANY					
117	LUBUMBASHI, ZAIRE	27.6	-11.4833	20.3	1273	TrBLD

Notes: MAT = Mean annual temperature. MAP = Mean annual precipitation. See Table 1.1 in Burgess (1981) for principal overstory components (species) for each site.

Spatial Resolution

Spatial resolution of field measurements at individual sites is not available in this data set. See individual NPP files archived at ORNL DAAC, where applicable, or primary data sources identified in the [**woodland.txt**] file for this information.

Temporal Coverage

The IBP woodlands field data were collected on site from the mid-1950s to the mid-1970s. The compiled data cover the 1955-1975 period, although most of the data cover ca. 1965-1975.

Temporal Resolution

Temporal resolution of field measurements at individual sites is not available in this data set. See individual NPP files archived at ORNL DAAC, where applicable, or primary data sources identified in the [**woodland.txt**] file for this information.

Data File Information

Table 3. Data files in this data set archive

FILE NAME	TEMPORAL COVERAGE	FILE CONTENTS
woodland.txt	1955/01/01-1975/12/31	IBP Woodlands Data Set. Complete synthesis of data for each of the 117 sites as published in DeAngelis et al. (1981). Each record contains site ID, parameter abbreviation, and values. 5,887 records. Terms and abbreviations used are given in Tables 4-8.
wdlnd_1.txt	1955/01/01-1975/12/31	Site location, biome, and selected forest productivity and soils data from IBP Woodlands Data Set. 117 records.
wdlnd_2.txt	1955/01/01-1975/12/31	Site name and climate data from IBP Woodlands Data Set. 117 records.
wdlnd_3.txt	1955/01/01-1975/12/31	Site ID, forest type, investigator(s), and years of the study from IBP Woodlands Data Set. 117 records.

NPP Data. The IBP Woodlands Data Set provides data for 117 globally distributed forest sites. The data were extracted from DeAngelis et al. (1981) and organized into four files, as described in Table 3. The variable values are delimited by semicolons. The first 16 lines in each file are metadata; data records begin on line 17. All NPP units are in g/m^2 (dry matter weight). Other units of measure are given in tables below. The values 999.9, -9.9, -9.99, -99.9, -99.90, -999, -9999, and -99999 are used to denote missing values.

The data records in each file are organized in alphabetical order by country. The first file [**woodland.txt**] provide the complete record for each forest site. This file contains 5,887 records.The data are arranged in a single column with each variable on a separate line. The other three files are arranged as row and column tables. The second file [**wdlnd_1.txt**] identifies site location, biome, and selected forest productivity and soils data. There is one line per record, for a total of 117 records. The third file [**wdlnd_2.txt**] provides climate data (temperature, precipitation, radiation, growing season length) organized by site. There is one line per record, for a total of 117 records. The fourth file [**wdlnd_3.txt**] provides site forest type, investigator(s) name(s), and years of the study, organized by site. There is one line per record, for a total of 117 records.

Abbreviations for data variables are used so that the data can be presented in a compact form. Tables 4-8 below provides definitions of abbreviations and terms used in conjunction with the data set (adapted from DeAngelis et al., 1981). Tables 9-12 provide definitions of column headings as they are used and organized in the data files. Data format notes are also available. References are provided for the source of the data and compilation process.

Several symbols are used in the biomass compartment tabulations:

- The number 0.0 means that a measurement was made but the value was not significantly different from 0.0;
- The symbol IN. OV. is used to indicate that a particular understory compartment is lumped with the corresponding overstory compartment;
- The symbol ** indicates a lumping of compartments. When this symbol appears it means that the particular compartment in question is lumped together with the next compartment below it in the column which has a numerical value attached; and
- Occasionally a range of values were given for a parameter measured at a site. The second value is included and identified by the parameter abbreviation with an 'X' as a suffix.

Table 4. Definitions for interpreting data in the data set

TERM	DEFINITION
Basal Area Increment	The amount of woody tissue added to the stand basal area per year through growth
Compartment	A division of the ecosystem for which we may measure organic matter in terms of dry weight
	The change in the size of a compartment during a year. For example, leaf mass in July 1970=812 g/m^2 and leaf

Increment (Net annual)	mass in July 1971=826 g/m^2. The increment is therefore 14 g/m^2/yr. Note that increment in this example does not include leaf litterfall. Similar definitions are used for branch and bole increments, with branch and bole litterfall not included in the increment.
Field Layer	Herbaceous plants, mosses and lichens. Woody plants less than 50 cm in height are included here.
Flux (Net annual)	The annual amount of organic matter being transferred (e.g., by litterfall) from one compartment to another
Frass	Includes insect excreta and may include other unidentifiable materials
Global Radiation	The sum of irradiance on a horizontal surface caused by direct solar radiation and diffuse short-wave radiation due to clouds, dust and molecular scattering from all parts of the sky. (Definition from Van Wijk and Scholte Ubing, 1966).
Overstory	The trees forming the main canopy
Productivity (Net annual)	The sum of litterfall plus all biomass increments plus consumption not accounted for in production
Radiation Balance	The difference between short-wave radiation from the sky and the sum of short-wave reflected radiation and long-wave terrestrial radiation
Soil Top Organic	Includes recently fallen litter (L layer) as well as decomposing organic layers on top of the mineral soil (F and H layers)
Standing Dead	Dead plants or parts of plants still standing in the forest
Stocking Density	Number of stems per hectare
Understory (or Substory)	The sum of sub-canopy and shrub layers

Table 5. Abbreviations used in site descriptions

ABBREVIATION	DEFINITION
ID	Site Number (1-117)
SITE	Site Name
INVEST	Name(s) of Investigator(s)
OTH_INVEST	Other investigator(s)
SEL_CITn	Selected citations, if more than on citation is given, each is numbered, e.g., SEL_CIT2.
YEARS	Years of study conducted
FOR_TYP	Forest type (biome classification)
SOIL_TYP	Soil type
GEOLOGY	Geology
SOIL_DR	Soil drainage
OVRSTORY	Principal overstory plant types (species)
UNDSTORY	Principal understory plant types (species)
FLD_LAYER	Principal field layer plant types (species)

Table 6. Abbreviations relevant to general site data

ABBREVIATION	DEFINITION	UNITS
AS	Age of stand	Years
LAI	Leaf area index	Square meters/square meter
BA	Basal area	Square meters/hectare
BAI	Basal area increment	Square meters/hectare
SH	Stand height	Meters
SD	Stocking density	Stems/hectare
SCA	Standing crop above-ground	Grams/square meter
SCB	Standing crop below-ground	Grams/square meter
PA	Productivity above-ground	Grams/square meter/year
PB	Productivity below-ground	Grams/square meter/year
LAT	Latitude	Decimal degrees
LNG	Longitude	Decimal degrees
ALT	Altitude (elevation above sea level)	Meters

MAT	Mean annual temperature	Degrees Centigrade
MAP	Mean annual precipitation	Millimeters
MAR	Mean annual radiation (global)	Calories/square centimeter/year
RBA	Radiation balance	Calories/square centimeter/year
LGS	Length of growing season	Days
TGS	Temperature during growing season	Degrees Centigrade
PGS	Mean precipitation in growing season	Millimeters
RGS	Mean radiation in growing season (global)	Calories/square centimeter/year
RBG	Radiation balance in growing season	Calories/square centimeter/year
SPH	Soil pH	
DRZ	Depth of rooting zone	Centimeters

Table 7. Abbreviations relevant to compartment biomass data (units are grams/square meter)

ABBREVIATION	DEFINITION
OL	Overstory leaves
OFF	Overstory fruits, flowers
OBR	Overstory branches-sum
OBRB	Overstory branches-bark
OBRW	Overstory branches-wood
OBO	Overstory bole-sum
OBOB	Overstory bole-bark
OBOW	Overstory bole-wood
OSTD	Overstory standing dead
OSUM	Sum overstory
UL	Understory leaves
UFF	Understory fruits, flowers
UBR	Understory branches-sum
UBRB	Understory branches-bark
UBRW	Understory branches-wood
UBO	Understory bole-sum
UBOB	Understory bole-bark
UBOW	Understory bole-wood
USTD	Understory standing dead
USUM	Sum understory
HERB	Herbaceous field
EPIP	Epiphytes total
PSUM	Total above-ground plants
RL	Living roots sum
RLL	Living roots > 5 mm
RLS	Living roots < 5 mm
RD	Dead roots
STO	Soil top organic
RZ	Rooting zone
IRZ	Intensive rooted
ERZ	Extensive rooted
SUBS	Subsoil
HETR	Heterotrophs sum
AGC	Above-ground consumers
DCFA	Decomposer fauna

DCFL	Decomposer flora
CS	Consumption total
CSF	Consumption foliage total
CSO	Consumption overstory

Notes: The above parameters are suffixed with the following (i.e., OL_A):

A = Amount
I = Increment
AR = Autotrophic Respiration (see Liriodendron Site, Oak Ridge, Tennessee)
HR = Heterotrophic Respiration (see Liriodendron Site, Oak Ridge, Tennessee)
P = Photosynthesis
R = Respiration

Table 8. Abbreviations relevant to compartment flux data (units are grams/square meter)

ABBREVIATION	DEFINITION
CSOW	Consumption wood-overstory
CSUW	Consumption wood-understory
CSR	Consumption roots-total
CSU	Consumption-understory
CSHB	Consumption -herbaceous
CSW	Consumption wood total
LF	Litterfall total
LFL	Litterfall leaf
LFFF	Litterfall flower, fruit
LFBR	Litterfall branch
LFBO	Litterfall bole
LFFR	Litterfall frass
LFEP	Litterfall epiphytes
ATIN	Atmospheric input
PRE	Precipitation
DRP	Dry particulates (dust)
GAF	Gaseous fixation
LEAC	Leaching
LWAS	Leaf wash
STMF	Stem flow
LSOL	Leaching soil layers
OUTP	Output
OPWI	Output wind erosion
OPWA	Output water erosion
OPPR	Output percolation

Table 9. Column headings, parameter definitions, and units for [**woodland.txt**] data file

COLUMN HEADING	DEFINITION	UNITS
SITE_ID	Site Number (1-117)	Numeric
PARM	Parameter. Refer to Tables 6-9 for abbreviations and definitions.	Text
VALUE	Site information, compartment biomass data value, or compartment flux data value. Refer to Tables 5-8 for units of measure.	Text or Numeric

Sample NPP Data Record [**woodland.txt**]

```
SITE_ID;PARM;VALUE
```

```
1;ID ;1
1;SITE ;MT DISAPPOINTMENT, AUSTRALIA
1;INVEST ;P. ATTIWILL
1;ADDRESS ;BOTANY SCHOOL, UNIVERSITY OF MELBOURNE, PARKVILLE, VICTORIA 3052, AUSTRALIA
1;SEL_CIT1;ATTIWILL, P. 1962. FOREST SCIENCE 8:132-41
1;SEL_CIT2;ATTIWILL, P. 1966. ECOLOGY 47:795-804
1;SEL_CIT3;ATTIWILL, P. 1968. ECOLOGY 49:142-145
1;SEL_CIT4;ATTIWILL, P. 1966. PLANT AND SOIL 24:390-406
1;SEL_CIT5;ATTIWILL, P. 1972. AUST. FOREST-TREE NUTRITION CONF. 39-46, 125-34
1;YEARS ;1955-1972
1;FOR_TYP ;BROAD-LEAVED EVERGREEN, EUCALYPTUS
1;SOIL_TYP;KRASNOZEN (RED FRIABLE POROUS EARTH)
1;GEOLOGY ;METAMORPHOSED SILURIAN MUDSTONES, SANDSTONES AND SHALES
1;SOIL_DR ;EXCELLENT
1;OVRSTORY;EUCALYPTUS OLBIQUA
1;AS ;51
1;LAI ;4.1
1;BA ;54.1
1;BAX ;63.3
1;BAI ;0.55
1;SH ;21.7
1;SHX ;29.1
1;SD ;704
1;SDX ;976
1;SCA ;31236
1;SCB ;7534
1;PA ;852
1;PB ;148
1;LAT ;-37.4167
1;LNG ;145.1667 ....
```

Table 10. Column headings, parameter definitions, and units for [**wdlnd_1.txt**] data file

<

COLUMN HEADING	DEFINITION	UNITS
ID	Site number (1-117)	Numeric
COUNTRY	Site location, by country	Text
LONG	Longitude of site	Decimal degrees
LAT	Latitude of site	
ALT	Altitude (elevation above sea level); lower value in range	Meters
ALTX	Altitude (elevation above sea level); upper value in range	
BIOME	Biome classification. See Table 1 for definitions	Text
AS	Age of stand; lower value in range	Years
ASX	Age of stand; upper value in range	
LAI	Leaf area index	Square meters/square meter
BA	Basal area	Square meters/hectare
BAI	Basal area increment	Square meters/hectare
SH	Stand height	Meters
SD	Stocking density	Stems/hectare
SCA	Standing crop above-ground	Grams/square meter
SCB	Standing crop below-ground	Grams/square meter
PA	Productivity above-ground	Grams/square meter/year
PB	Productivity below-ground	Grams/square meter/year
SPH	Soil pH; lower value in range	Numeric
SPHX	Soil pH; upper value in range	
DRZ	Depth of rooting zone	Centimeters

Sample NPP Data Record [**wdlnd_1.txt**]

ID;COUNTRY ; LONG; LAT; ALT;ALTX;BIOME ; AS; ASX; LAI; BA; BAI; SH; SD; SCA; SCB; PA; PB; SPH;SPHX; DRZ

1;AUSTRALIA ; 145.1667;-37.4167; 545;-999;MeBLE ; 51.0;-99.9; 4.10; 54.1; 0.55; 21.70; 704; 31236; 7534; 852.0; 148.0; 5.2; 5.9; 100
2;BELGIUM ; 4.3500; 50.0667; 245;-999;TeBLD ; 80.0;-99.9; 6.80; 21.2; 0.60; 16.00; 1250; 12100; 3500;1224.0; 233.0;-9.9;-9.9; 30
3;BRAZIL ; -60.0000; -4.0000; 90;-999;TrBLE ;999.0;-99.9;-99.90; 30.7;-9.99; 38.10; 93780; 40600; 6720;-999.9;-999.9; 3.1; 4.4; 110
4;CANADA ; -78.3833; 45.2333; 465;-999;BoNLE ; 84.0;-99.9; 11.60; 32.3; 0.31; 14.90; 3311; 12151; 2800; 451.2;-999.9; 4.3;-9.9; 13 ...

Table 11. Column headings, parameter definitions, and units for [**wdlnd_2.txt**] data file

COLUMN HEADING	DEFINITION	UNITS
ID	Site number (1-117)	Numeric
SITE	Site location, by country, with sub-site identification	Text
MAT	Mean annual temperature	Degrees Centigrade
MAP	Mean annual precipitation	Millimeters
RBA	Radiation balance	Calories/square centimeter/year
LGS	Length of growing season	Days
TGS	Temperature during growing season	Degrees Centigrade
PGS	Mean precipitation in growing season	Millimeters
RGS	Mean radiation in growing season (global)	Calories/square centimeter/year
RBG	Radiation balance in growing season	Calories/square centimeter/year

Sample NPP Data Record [**wdlnd_2.txt**]

ID;SITE;MAT;MAP;MAR;RBA;LGS;TGS;PGS;RGS;RBG

1;MT DISAPPOINTMENT, AUSTRALIA ; 11.2; 982;-99999;-99999; 365; 11.2; 982;-99999;-99999
2;VIRELLES, BELGIUM ; 8.5; 952; 93131; 41150; 155; 13.8; 450; 57198; 27875
3;MANAUS, BRAZIL ; 27.2; 1771;-99999;-99999; 365; 27.2; 1771;-99999;-99999
4;ONTARIO SITE REGION 5, SITE 1 (DRY), CANADA ; 4.0; 1243;-99999;-99999; 167; 14.0; 469;-99999;-99999
5;ONTARIO SITE REGION 5, SITE 2 (FRESH), CANADA ; 4.0; 1243;-99999;-99999; 167; 14.0; 469;-99999;-99999
6;ONTARIO SITE REGION 5, SITE 3 (MOIST), CANADA ; 4.0; 1243;-99999;-99999; 167; 14.0; 469;-99999;-99999 ...

Table 12. Column headings, parameter definitions, and units for [**wdlnd_3.txt**] data file

COLUMN HEADING	DEFINITION	UNITS
ID	Site number (1-117)	Numeric
FOR_TYP	Forest type (biome classification, dominant tree species, forest association, or edaphic characterization)	Text
INVEST	Name(s) of Investigator(s)	Text
YEARS	Years of study conducted	Years

Sample NPP Data Record [**wdlnd_3.txt**]

ID;FOR_TYP;INVEST;YEARS

1;BROAD-LEAVED EVERGREEN, EUCALYPTUS ;P. ATTIWILL ;1955-1972
2;MIXED OAK ;P. DUVIGNEAUD, A. GALOUX ;1964-1969
3;TROPICAL RAIN FOREST ; ;1970
4;SPRUCE ;ALAN G.GORDON ;1961-1975
5;SPRUCE ;ALAN G.GORDON ;1961-1975
6;SPRUCE ;ALAN G.GORDON ;1961-1975 ...

3. Data Application and Derivation:

The Woodlands Data Set provides a unique historical resource for the analysis of forest ecosystems. Previous to this compilation, attempts to compare the forests of the world were limited by the small number of research sites which had been documented with methods and parameters similar enough to permit comparison. O'Neill and DeAngelis (1981) compared the Woodlands Data Set with other analyses of general patterns in world forests that had appeared in the literature. Among the analyses compared were the proposed relationship between productivity and climatic variables, the quantity of leaf and total litterfall by type and region, and the ratio of wood production to leaf litter production as a function of growing season global radiation. O'Neill and DeAngelis (1981) also analyzed the Woodlands Data Set to determine forest characteristics that were relatively independent of site and species differences. Although the differences among the research sites are quite large, some patterns were consistent across all forests, such as stand height as a function of total above-ground biomass and the relationship between diameter classes and the density of trees. Other characteristics hold true for major forest types, such as evergreen and deciduous, or gymnosperms and angiosperms. An example of the latter is biomass of various plant components as a function of total above-ground biomass.

4. Quality Assessment:

The projects submitting data to the Woodlands Data Set were diverse, both internationally and in the scope and emphasis of their research. Because of this, the data did not always conform easily to the uniform format in which it is presented here. According to the compilers (DeAngelis et al., 1981), "Repeated communications with members of various projects were often employed before deciding on appropriate values. We have tried to follow faithfully the wishes of the projects in this regard."

Some data quality caveats are as follows:

- In some cases, the meteorological and climatological measurements in the general site descriptions represent values averaged over many years and in other cases, are values only for the years during which biomass measurements were made. In some cases, the meteorological measurements were made directly at the site, while in other cases they were made at nearby stations.
- Lack of precise and generally agreed upon definitions is evident with respect to some quantities.
- Because of the variety of data forms submitted, with different compartmentalizations of the soil layers, values of the various soil compartments are not always consistent from site to site.
- Occasionally discrepancies occur between values which are listed as sums of two or more compartments and the actual values in those compartments. The same holds true for net annual productivity; the value given for this is not always equal to the sum of fluxes and increments. Often, the reason for this is that the researchers have used their own insight to take into consideration other factors such as consumption, which could not be directly measured and, therefore, were not given in the biomass data.

Rigorous comparisons among sites are complicated because of the above data constraints and because for each site there many be additional highly pertinent facts which could not be included in the data summaries. See O'Neill and DeAngelis (1981) for a discussion of these constraints. Those users of the data wishing to pursue similar analyses may also want to consult the primary literature publications relevant to each site, which are cited in the general site descriptions in DeAngelis et al. (1981) and in [**woodland.txt**].

Sources of Error

Information not available.

5. Data Acquisition Materials and Methods:

The Woodlands Data Set represents the integrated product of collaborating scientists from 23 countries around the world. Implementation of an international woodlands program began with a workshop in 1968 in Tennessee, U.S.A., published as *Analysis of Temperate Forest Ecosystems* (Reichle, 1970). This was followed by *Productivity of Forest Ecosystems of the World* (Duvigneaud, 1971), a UNESCO symposium held in 1969 in Brussels, Belgium. In 1971, a workshop in Sweden (Rosswell, 1971) refined conceptual approaches and analytical measurements for forest studies. Three additional workshops were held to facilitate exchange and analysis of the data being produced. The data files of the first workshop in 1972 in Tennessee were published as *Modeling Forest Ecosystems* (Reichle et al., 1972). From the next workshop in 1974 in Gottingen, Germany, an updated data file was prepared and published as *Data Analysis and Data Synthesis of Forest Ecosystems* (Ulrich et al., 1974). A common computer format was established and computer storage and analysis of data was undetaken by Oak Ridge National Laboratory (ORNL). In 1975, the last workshop was held in Jadrass, Sweden, to update the data files. The results of this sequence is the Woodlands Data Set, published in DeAngelis et al. (1981).

In DeAngelis et al. (1981), the data for each site were organized into three general parts. The first part identified the investigator(s), selected citations, years of the study, forest type, soil and geology types, and principal plant types. The second part consisted of general site description data, including edaphic characteristics, average meteorological conditions, and basic descriptive and quantitative data on the vegetation. In the last part, data for up to 38 biomass compartments are presented. Tables present the measured amounts and increments in these compartments, as well as the fluxes between them.

The data in DeAngelis et al. (1981) were extracted and reorganized in digital format and archived in 1997 by ORNL DAAC. The latitude and longitude coordinates were converted to decimal degrees and a biome type from Burgess (1981) was added to each site record.

6. Data Access:

These data are available through the Oak Ridge National Laboratory (ORNL) Distributed Active Archive Center (DAAC).

Data Archive Center:

Contact for Data Center Access Information:
E-mail: uso@daac.ornl.gov
Telephone: +1 (865) 241-3952

7. References:

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