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Data description for the DANS project:

Disclosure of paleoecological datasets of IBED, FNWI, UvA

(NL titel: Ontsluiting van paleoecologische datasets van IBED, FNWI, UvA)

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Abstract:

The Paleoecology group of IBED has collected sediment cores in lakes and analyzed the samples for pollen during many decades, but the resulting data have not been digitized in a systematic way. Therefore a project was funded by DANS with the aim to archive data and at making them public domain. The focus of this project is on the large amounts of pollen data from South America, mainly Colombia. Metadata were collected from the publications, where necessary taxon names were adapted to modern nomenclature, all age models were fitted using the same methodology and data were entered in spreadsheets, together with the raw pollen counts. From these spreadsheets ASCII files were created (CSV-format) and archived on the DANS server (EASY, <https://easy.dans.knaw.nl/>). The data from 62 sediment cores were uploaded: 3 cores from Bolivia, 53 from Colombia, 1 from Ecuador, 1 from Guatemala, 1 from Mexico, and 3 from Peru. All these data are now in EASY and can be downloaded from there.

If you use the data from this database please reference this report as:

Van Boxel JH, Brandts EB, Flantua SGA, Grimm EC, Hooghiemstra H, Van Loon EE (2017). Data description for the DANS project: Disclosure of paleoecological datasets of IBED, FNWI, UvA. *Report of the Department Ecosystem and Landscape Dynamics, Institute for Biodiversity and Ecosystem Dynamics, University of Amsterdam.* 19 pp .

1. Introduction

Paleoecological datasets can be used to reconstruct the vegetation in the deep past, i.e. thousands of years back in time and in some cases even millions of years in the past (e.g. Torres et al., 2013). The vegetation composition provides information on the environment and climatic conditions in which the plants were growing can be inferred. Therefore these datasets can also be used for the reconstruction of past climates.

The paleoecology group of the Institute for Biodiversity and Ecosystem Dynamics (IBED) of the University of Amsterdam has collected sediment cores for six decades, mostly in Europe and in South America. From these cores samples were taken and analyzed for one or more proxies, like pollen grains, spores and lithology. Dating was often done by measuring radioactive carbon (^{14}C dating) (Flantua et al., 2016). The long records, however, reach ages far beyond the maximum age that the radiocarbon method can accommodate (ca. 50 kyr before present). For these records orbital tuning was used to fit the observed peaks to the orbital record of climate change (e.g. Groot et al., 2011; Torres et al., 2013).

Large amounts of data were collected, but the data often remained in the archives of the researchers that had produced them. This practice produces a big risk of losing the data and moreover the data are not available to other researchers. To fuel new projects and research questions the data should be archived in a professional manner and they should be available to others. DANS gave us the opportunity to archive the data at their server and also provided funding for a project on which we could hire a junior researcher to do much of the work. The aim of this project was to collect and check the relevant data of 50 cores and to publish the data in the DANS archive (<https://dans.knaw.nl/nl>) in an orderly manner.

2. Methods

At the Department of Ecosystem and Landscape Dynamics (ELD) many paleoecological data were available, often already in digital form.

We designed a template in Excel to make sure that the data of all sediment cores considered were presented in the same way. The data of each core were copied in a separate spreadsheet. Since taxonomy has changed over the past 60 years, taxon names were adapted to the current (2017) taxonomy with the help of Eric Grimm of the University of Minnesota (US). He also recalculated the age models using the modern IntCal13 calibration curve (Reimer et al., 2013). However the age model, determined by the original data producers, was also maintained in the data files. For all cores the coordinates of the location where the core was collected were checked and when needed corrected. We also collected the original publications in which the sediment cores were described and the records presented. The references to these articles and to additional publications were also included in the spreadsheets as metadata (Table 1).

Table 1: Most important metadata, chronology and other information.

Site description	Persons & Publications	Other information
Site Name	Collectors	¹⁴ C dates (geochronology)
Latitude [°]	Researchers	Age models (chronologies)
Longitude [°]	Data processors	
Elevation [m]	Contact person	
Country		
Department	Publication(s)	<i>Only if available:</i>
Description		<i>Lithology</i>

The data were also copied into TILIA for a consistency check, especially to check whether taxon names were according to the current (2017) taxonomy. Entering the data in TILIA also made it possible to upload the data to the international Neotoma database (<https://www.neotomadb.org/>; Grim et al., 2013).

The Excel spreadsheets were converted to ASCII files in CSV format. For each record we produced at least three ASCII files: Metadata, Chronology, Pollen record. Most records also have a separate file describing the lithology. Table 2 describes how we named the data files.

Table 2: System for naming the data files

Document name		COUNTRY_HANDLE-YEAR_TYPE.csv		(The Excel file has the extension .xlsx)
For example:		COL_AGUABLA1-1982_META.csv		
Codes:	COUNTRY	3-letter abbreviation of the country where the core was taken	BOL = Bolivia COL = Colombia ECU = Ecuador GUA = Guatemala MEX = México PER = Perú	
	HANDLE	8 letter abbreviation for the core	Zie tabel 3	
	YEAR	Year the core was collected		
	TYPE	Indication for the type of document	META = Metadata RAW = Pollen counts CHRON = Dating and chronologies LITH = Lithology (if available) Excel = The complete spreadsheet	
NOTE: CSV stands for Comma Separated Values. However, the values in these files are not separated by commas, as the name suggests, but by semicolons because a comma can appear as part of a number.				

The ASCII data files will hopefully last forever. That is why all data have been stored in CSV format. These CSV files can be loaded into any spreadsheet program.

Many users of these data will indeed load these data into a spreadsheet in order to analyze them. Therefore we have also stored the Excel spreadsheets from which the CSV files were produced. These are already formatted in such a way that they are easily readable.

Table 3: Overview of the most important metadata for each core (Age: BP is before 1950).

Country	HANDLE	Coring year	Location	Coordinates		Elevation [m]	Age range [cal yr BP]	Nr. of samples	References
BOL	CHALALAN	2003	Lake Chalalán	14,43 S	67,92 W	330	-53 - 16511	39	45
BOL	SANTAROS	2003	Lake Santa Rosa	14,48 S	67,87 W	350	5 - 16108	34	45
BOL	TITICACA	2001	Lake Titicaca	16,20 S	69,00 W	3810	0 - 210898	184	26 27 29 30 43
COL	AGUABLA1	1982	Páramo de Agua Blanca 1	4,99 N	74,16 W	3250	-32 - 383731	104	1 31 32 34 52
COL	AGUABLA2	1982	Páramo de Agua Blanca 2	4,99 N	74,16 W	3250	70 - 9197	20	35
COL	AGUABLA3	1982	Páramo de Agua Blanca 3	4,99 N	74,16 W	3250	26 - 8883	24	35
COL	ANDABOBO	1972	Andabobos	4,10 N	74,25 W	3750	1275 - 17852	74	18 38 39
COL	BOCQUEZ	1977	Boca de López	10,85 N	74,33 W	0	-13 - 7786	101	55
COL	BOQUILLAS	1998	Boquillas	9,12 N	74,56 W	20	1696 - 11413	49	11 12
COL	CABOSQUE	1996	Laguna Carimagua-Bosque	4,59 N	71,33 W	180	-46 - 1032	27	11 13
COL	CAIMITO1	1997	Laguna El Caimito	2,45 N	77,69 W	50	-3 - 3806	119	46 60 62
COL	CARIMAGU	1996	Laguna Carimagua	4,59 N	71,33 W	180	1281 - 9218	41	7 13
COL	CHENEVO1	2000	Laguna Chenevo	4,59 N	71,44 W	150	-50 - 8172	37	11 14
COL	EL_PINAL	1996	Laguna El Piñal	4,66 N	71,45 W	180	969 - 21536	36	7
COL	ELPATIA1	2000	El Patía-1	2,01 N	77,12 W	580	-50 - 9513	84	58 59
COL	ELPATIA2	2000	El Patía-2	2,01 N	77,12 W	580	-50 - 8450	53	58 59
COL	FUQUENE2	1967	Laguna de Fúquene	5,46 N	73,75 W	2540	107 - 44474	102	17 28 56 57
COL	GENAGRA1	1996	Pantano de Genagra	2,47 N	76,60 W	1730	58 - 52000	47	5 64
COL	GOBERNAD	1973	Laguna Gobernador	3,95 N	74,30 W	3815	57 - 11488	86	18 38 39
COL	GUIARRA	1972	Laguna La Guitarra	3,95 N	74,16 W	3450	544 - 18363	120	18 38 39
COL	HERRERA1	1957	Laguna de la Herrera	4,69 N	74,27 W	2550	69 - 5820	46	51 61
COL	LACOCOA3	2006	Laguna De La Cocha	1,12 N	77,15 W	2780	-51 - 3134	115	21
COL	LAGUNIL5	1959	Valle de Lagunillas V	6,38 N	72,34 W	3931	-1 - 14759	71	24
COL	LAGUNIL7	1959	Valle de Lagunillas VII	6,39 N	72,35 W	3922	No dates	11	24
COL	LAGUNIL8	1959	Valle de Lagunillas VIII	6,39 N	72,34 W	3923	609 - 10485	16	24
COL	LATETA-2	1997	La Teta-2	3,08 N	76,53 W	1020	-47 - 9936	39	11 15
COL	LG-ALSAC	1981	Laguna Negra de Alsacia	3,97 N	74,09 W	3100	3150 - 28378	79	38 39
COL	LG-ANGEL	1996	Laguna Angel	4,45 N	70,54 W	200	-46 - 11580	27	6
COL	LGCIEGA1	1967	Laguna Ciega I	6,47 N	72,39 W	3510	389 - 33827	78	54
COL	LGCIEGA3	1967	Laguna Ciega III	6,47 N	72,39 W	3510	496 - 33234	64	48
COL	LOMALIND	1996	Laguna Loma Linda	3,30 N	73,36 W	233	103 - 9856	67	8
COL	LOSBOBOS	1959	Laguna de los Bobos	6,22 N	72,76 W	3815	49 - 6583	22	47
COL	MARGARIT	1996	Laguna Las Margaritas	3,37 N	73,42 W	240	646 - 11186	190	63
COL	MONICA-1	1995	Pantano de Mónica 1	0,70 S	72,05 W	160	4804 - 14075	17	10
COL	MONICA-2	1995	Pantano de Mónica 2	0,71 S	72,06 W	112	-45 - 4499	21	10 11
COL	MONICA-3	1995	Pantano de Mónica 3	0,70 S	72,06 W	160	-45 - 3542	19	10 11
COL	MOZAMBIQ	2000	Laguna Mozambique	3,95 N	73,05 W	175	17 - 3685	51	11 14
COL	PENANEG1	1982	Páramo de Peña Negra 1	5,07 N	74,10 W	3625	-27 - 16609	71	35
COL	PIAGUA-1	1997	Piagua	2,43 N	76,78 W	1700	-47 - 20370	121	62 64
COL	PIUSBI-1	1996	Laguna Piusbi	1,88 N	77,93 W	100	69 - 5625	57	9 46
COL	PLVERDE1	1982	Páramo de Laguna Verde 1	5,22 N	74,00 W	3647	21 - 6248	45	35
COL	POTRERIL2	2000	Potreriillo-2	2,10 N	77,05 W	750	0 - 9273	47	25
COL	PRIMAVE1	1973	Laguna La Primavera 1	3,98 N	74,16 W	3547	19 - 8175	130	18 36 37
COL	PRIMAVE2	1981	Laguna La Primavera 2	3,98 N	74,16 W	3547	10521 - 13399	91	36 37 53
COL	PVARGAS1	1996	Pantano de Vargas 1	5,77 N	73,06 W	2488	2054 - 10177	119	23
COL	QUEBAMOR	?	Quebrada del Amor	0,60 S	72,40 W	381	-49 - 100	26	16
COL	QUILIC-1	1997	Quilichao-1	3,10 N	76,52 W	970	-43 - 14375	112	11 15
COL	RABONA-1	1972	Cuchilla La Rabona	4,00 N	74,25 W	4000	14-7283	29	18 38 39
COL	ROSAGRND	?	Rosarito Grande	4,89 N	75,21 W	3320	29907 - 43860	25	41 42 49
COL	ROSARITO	?	Rosarito	4,90 N	75,23 W	3400	2908 - 28438	30	41 42 49
COL	SARDINAS	1996	Laguna Sardinias	4,95 N	69,53 W	80	-46 - 13536	46	6
COL	TIMBIO-1	1997	Rio Timbio	2,36 N	76,70 W	1750	498 - 31289	71	62 64 65
COL	VBOCAT09	1959	Valle de la Bocatoma IX	6,37 N	72,33 W	4117	830 - 7548	18	24
COL	VBOCAT10	1959	Valle de la Bocatoma X	6,37 N	72,32 W	4288	No dates	4	24
COL	VBOCAT11	1959	Valle de la Bocatoma X	6,37 N	72,33 W	3998	No dates	9	24
COL	VISITADO	1958	Ciénaga del Visitador	6,18 N	72,80 W	3300	185 - 16532	46	50 61
ECU	MAXUS-S5	1994	Maxus Site 5	0,69 S	76,44 W	246	-44 - 71222	16	3 4
GUA	PETENITZ	2006	Lake Petén-Itzá	17,01 N	89,69 W	110	40 - 85408	445	19 20 22 33 40
MEX	LAGARTO2	2011	Ría Lagartos-2	21,58 N	88,07 W	2	8 - 3812	64	2
PER	REFUGIO1	2006	Lake Refugio 1	13,09 S	71,70 W	3401	-56 - 18894	31	44
PER	REFUGIO2	2006	Lake Refugio 2	13,10 S	71,71 W	3406	-56 - 18847	18	44
PER	REFUGIO3	2006	Lake Refugio 3	13,10 S	71,71 W	3404	-56 - 10572	6	44

3. Pollen records in the database

The database contains the data of 62 records from Central America and South America, collected between 1957 and 2011. Most records (53) are from Colombia, where research of the Paleoecology group of IBED was focused. Additionally there were also three cores from Bolivia, one from Ecuador, one from Guatemala, one from Mexico and three from Peru (Table 3).

The number of samples taken along the sediment cores varies from 4 to 445 (Table 3). On average 64 samples were taken per core, and the total number of analyzed pollen samples amounts 3991. In total 1.8 million pollen grains and 2.4 million spores were identified (some were classified as unknown taxa). To give an idea of the investment in time (and research money) mostly 1 to 2 pollen samples are analyzed per day.

The map in Figure 1 shows the locations of the records uploaded in DANS.



Figure 1: Locations where the cores were collected. Red dots represent cores in Colombia and blue dots show cores in other countries. Some coring sites are so close together that they not show up as separate dots (map by Eric Grimm).

4. Data organization and data format

The data files reside in 6 folders, one for each country for which we have data: Bolivia, Colombia, Ecuador, Guatemala, Mexico and Peru. Within these folders there is one subfolder for each record. The naming of these subfolders is equivalent to that of the file names: that is COUNTRY_HANDLE_YEAR, where COUNTRY is the 3-letter abbreviation for the country, HANDLE is an 8-letter code for the record and YEAR is the year the sediment core was retrieved (also see Table 2). If the date of core collection is unknown 9999 is entered for the year. Each subfolder contains at least 4 files: the spreadsheet with all the information in an easily readable format and three ASCII files in CSV format for the metadata, the chronology and the pollen counts (Table 2, Figure 2). Most subfolders also contain an ASCII file in CSV format describing the lithology.

The Excel spreadsheets present the data in a readable format. The spreadsheets contain 5 worksheets titled: Metadata, Raw_data, Geochronology, Chronologies and Lithology. These will be described in more detail in the sub-sections below. However, the disadvantage of spreadsheets is that the way the data are represented internally varies for different spreadsheet programs and will also vary between different versions of the same program. LOTUS123, once the standard spreadsheet, is hardly used anymore. We had some difficulties reading old data from the LOTUS123 spreadsheets in the WK1 format. So it is well possible that in 10 or 20 years from now it will be difficult to read the spreadsheets we are using now.

This is the reason why the data are also stored as ASCII files. ASCII already existed long before spreadsheets were invented and ASCII files will probably continue to be used in the far future. The files are in CSV format, where CSV stand for Comma Separated Values. However, since commas can also be used as a decimal mark or as a thousand mark, it is inconvenient to use them to separate the values. Therefore, here the values in the CVS file are separated by semicolons (";") and not by commas. These CSV files can easily be imported into spreadsheets (also into other spreadsheets than Excel). In the CSV files the Geochronology and the Chronologies are combined into one file. So there are 4 CSV files per core or 3 if there is no information on the lithology.

Appendix 1a, 2a, 3a and 4a include screen shots showing what the data look like in the original Excel spreadsheet. Appendix 1b, 2b, 3b and 4b show what they look like as an ASCII file in CSV format and what they will look like when the CSV file is imported again into a spreadsheet. With some formatting the original layout can be restored.

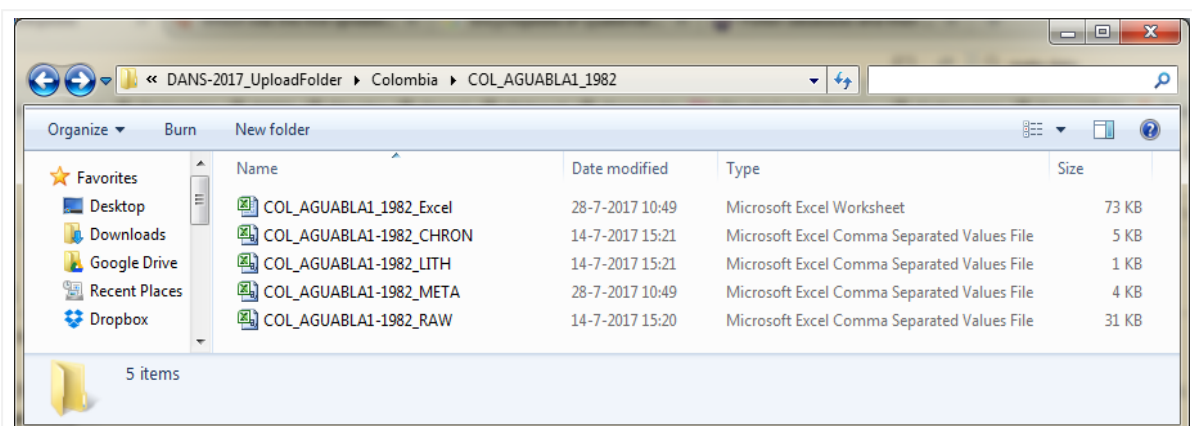


Figure 2: Typical content of a folder containing the data from one record.

5. Conclusion

A significant volume of unconsolidated paleoecological data has been saved and has been made public domain to serve new research and to fuel new research questions. The uploaded database now contains 62 palynological records from 6 countries in Latin America: Colombia, Mexico, Guatemala, Ecuador, Peru and Bolivia. 53 records are from Colombia. Storing these records at DANS safe guards many years of work and also makes the data available for other researchers. The metadata of all records have been checked, including coordinates and taxon names, and age models were recalibrated using the modern IntCal13 calibration curve. Also the original age model is retained in the data files.

Since the data were also entered in TILIA it is also possible to upload them to the international Neotoma database.

Finally, we are pleased to observe a change in opinion about the ownership of data produced with financial support from national funding agencies. For a long time such data have been considered as belonging to the private domain. Nowadays many palynologists are willing to make their data public domain. The DANS initiative is timely and important to save data, produced during tens of years of NWO and WOTRO funded research. The present project reflects a welcome start and deserves continuation.

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References

NOTE: Numbered references from Table 3 are in a separate list below.

- Flantua SGA, Hooghiemstra H, Grimm EC, Behling H, Bush MB, González-Arango C, Gosling W, Ledru M-P, Lozano-García S, Maldonado A, Prieto A, Rull V, Van Boxel JH (2015)** Updated site compilation of the Latin American Pollen Database; challenging new research. *Review Palaeobotany Palynology* 223: 104-115.
- Flantua SGA, Blaauw, Hooghiemstra H (2016).** Geochronological database and classification system for age uncertainties in Neotropical pollen records. *Climate of the Past* 12: 387-414. doi: 10.5194/cp-12-387-2016
- Grimm EC, Bradshaw RHW, Brewer S, Flantua SGA, Giesecke T, Lézine A-M, Takahara H, Williams JW (2013)** Databases and Their Application. In: Elias S.A. (ed.) *The Encyclopedia of Quaternary Science, second edition, vol. 3*: 831-838. Amsterdam: Elsevier. <https://doi.org/10.1016/B978-0-444-53643-3.00174-6>
- Groot MHM, Bogota RG, Lourens LJ, Hooghiemstra H, Vriend M, Berrío JC, Tuenter E, Van der Plicht J, Van Geel B, Ziegler Z, Weber SL, Betancourt A, Contreras L, Gaviria S, Giraldo C, Gonzalez N, Jansen JHF, Konert M, Ortega D, Rangel O, Sarmiento G, Vandenberghe J, Van der Hammen T, Van der Linden M, Westerhoff W (2011)** Ultra-high resolution pollen record from the northern Andes reveals rapid shifts in montane climates within the last two glacial cycles. *Climate of the Past* 7: 299–316. doi: 10.5194/cp-7-299-2011.
- Hooghiemstra H, Flantua SGA (2017).** Hergebruik van data. LAPD – Latin American Pollen Database. *GeoBrief* mei 2017, pp. 14-15.
- Torres V, Hooghiemstra H, Lourens L, Tzedakis PC (2013)** Astronomical tuning of long pollen records reveals the dynamic history of montane biomes and lake levels in the tropical high Andes during the Quaternary. *Quaternary Science Reviews* 63: 59-72. doi: 10.1016/j.quascirev.2012.11.004.

Numbered references from Table 3

- 1 Andriessen, PAM, Helmens KF, Hooghiemstra H, Riezebos PA, Van der Hammen T (1994). Absolute chronology of the Pliocene-Quaternary sediment sequence of the Bogota area, Colombia. *Quaternary Science Reviews* 12(7): 483-501. [DOI: 10.1016/0277-3791(93)90066-U]
- 2 Aragón-Moreno AA, Islebe GA, Torrescano-Valle N. (2012). A ~3800-yr, high-resolution record of vegetation and climate change on the north coast of the Yucatan Peninsula. *Review of Palaeobotany and Palynology* 178: 35-42. [DOI: 10.1016/j.revpalbo.2012.04.002]
- 3 Athens JS (1997). Paleoaambiente del Oriente ecuatoriano: resultados preliminares de columnas de sedimentos procedentes de humedales. *Fronteras de Investigación* 1(1): 15-32.
- 4 Athens JS, Ward JV (1999). The late Quaternary of the western Amazon: climate, vegetation, and humans. *Antiquity* 73(280):287-302. [DOI: 10.1017/S0003598X00088256]
- 5 Behling H, Negret AJ, Hooghiemstra H (1998). Late Quaternary vegetational and climatic change in the Popayán region, southern Colombian Andes. *Journal of Quaternary Science* 13(1): 43-53. [DOI: 10.1002/(SICI)1099-1417(199801/02)13:1<43::AID-JQS348>3.0.CO;2-G]
- 6 Behling H, Hooghiemstra H (1998). Late Quaternary palaeoecology and palaeoclimatology from pollen records of the savannas of the Llanos Orientales in Colombia. *Palaeogeography, Palaeoclimatology, Palaeoecology* 139(3-4):251-267. [DOI: 10.1016/S0031-0182(97)00139-9]
- 7 Behling H, Hooghiemstra H (1999). Environmental history of the Colombian savannas of the Llanos Orientales since the Last Glacial Maximum from lake records El Pinal and Carimagua. *Journal of Paleolimnology* 21(4):461-476. [DOI: 10.1023/A:1008051720473]
- 8 Behling H, Hooghiemstra H (2000). Holocene Amazon rainforest–savanna dynamics and climatic implications: high-resolution pollen record from Laguna Loma Linda in eastern Colombia. *Journal of Quaternary Science* 15(7): 687-695. [DOI: 10.1002/1099-1417(200010)15:7<687::AID-JQS551>3.0.CO;2-6]
- 9 Behling H, Hooghiemstra H, Negret AJ (1998). Holocene history of the Chocó rain forest from Laguna Piusbi, southern Pacific Lowlands of Colombia. *Quaternary Research* 50(3): 300-308. [DOI: <https://doi.org/10.1006/qres.1998.1998>]
- 10 Behling H, Berrio JC, Hooghiemstra H (1999). Late Quaternary pollen records from the middle Caquetá river basin in central Colombian Amazon. *Palaeogeography, Palaeoclimatology, Palaeoecology* 135(1-3): 193-213. [DOI: [10.1016/S0031-0182\(99\)00139-9](https://doi.org/10.1016/S0031-0182(99)00139-9)]
- 11 Berrío Mogollón JC (2002) Lateglacial and Holocene vegetation and climatic change in lowland Columbia. PhD Thesis Universiteit van Amsterdam, Amsterdam, The Netherlands.
- 12 Berrío JC, Boom A, Botero PJ, Herrera LF, Hooghiemstra H, Romero F, Sarmiento G (2001). Multi-disciplinary evidence of the Holocene history of a cultivated floodplain area in the wetlands of northern Colombia. *Vegetation history and archaeobotany* 10(3): 161-174.
- 13 Berrio JC, Hooghiemstra H, Behling H, Van der Borg K (2000). Late Holocene history of savanna gallery forest from Carimagua area, Colombia. *Review of Palaeobotany and Palynology* 111(3-4):295-308. [DOI: 10.1016/S0034-6667(00)00030-0]
- 14 Berrio JC, Hooghiemstra H, Behling H, Botero P, Van der Borg K (2002). Late-Quaternary savanna history of the Colombian Llanos Orientales from Lagunas Chenevo and Mozambique: a transect synthesis. *The Holocene* 12(1): 35-48. [DOI: 10.1191/0959683602h1518rp]
- 15 Berrío JC, Hooghiemstra H, Marchant R, Rangel O (2002). Late-glacial and Holocene history of the dry forest area in the south Colombian Cauca Valley. *Journal of Quaternary Science* 17(7): 667-682. [DOI: 10.1002/jqs.701]
- 16 Berrío JC, Arbeláez MV, Duivenvoorden JF, Cleef AM, Hooghiemstra H (2003). Pollen representation and successional vegetation change on the sandstone plateau of Araracuara, Colombian Amazonia. *Review of Palaeobotany and Palynology* 126(3-4): 163-181. [DOI: 10.1016/S0034-6667(03)00083-6]
- 17 Bogotá-A RG, Groot MHM, Hooghiemstra H, Lourens LJ, Van der Linden M, Berrio JC (2011). Rapid climate change from north Andean Lake Fúquene pollen records driven by obliquity: implications for a basin-wide biostratigraphic zonation for the last 284 ka. *Quaternary Science Reviews* 30(23-24): 3321-3337. [DOI: 10.1016/j.quascirev.2011.08.003]

- 18 Cleef AM (1981). The vegetation of the Páramos of the Colombian Cordillera Oriental. PhD Thesis University of Amsterdam, Amsterdam, The Netherlands. Notes: Published by J. Cramer, Vaduz, Lichtenstein.
- 19 Correa-Metrio A, Bush MB, Hodell DA, Brenner M, Escobar J, Guilderson T (2012). The influence of abrupt climate change on the ice-age vegetation of the Central American lowlands. *Journal of Biogeography* 39(3): 497-509. [DOI: 10.1111/j.1365-2699.2011.02618.x]
- 20 Correa-Metrio A, Bush MB, Cabrera KR, Sully S, Brenner M, Hodell DA, Escobar J, Guilderson T (2012). Rapid climate change and no-analog vegetation in lowland Central America during the last 86,000 years. *Quaternary Science Reviews* 38: 63-75. [DOI: 10.1016/j.quascirev.2012.01.025]
- 21 Epping I (2009). Environmental change in the Colombian upper forest belt. Master's thesis. University of Amsterdam, Amsterdam, The Netherlands.
- 22 Escobar J, Hodell DA, Brenner M, Curtis JH, Gilli A, Mueller AD, Anselmetti FS, Ariztegui D, Grzesik DA, Pérez L, Schwalb A, Guilderson TP (2012). A ~43-ka record of paleoenvironmental change in the Central American lowlands inferred from stable isotopes of lacustrine ostracods. *Quaternary Science Reviews* 37: 92-104. [DOI: 10.1016/j.quascirev.2012.01.020]
- 23 Gómez A, Berrío JC, Hooghiemstra H, Becerra M, Marchant R (2007). A Holocene pollen record of vegetation change and human impact from Pantano de Vargas, an intra-Andean basin of Duitama, Colombia. *Review of Palaeobotany and Palynology* 145(1): 143-157. [DOI: <http://doi.org/10.1016/j.revpalbo.2006.10.002>]
- 24 Gonzalez E, Van der Hammen T, Flint RF (1965). Late Quaternary glacial and vegetational sequence in Valle de Lagunillas, Sierra Nevada del Cocuy, Colombia. *Leidse Geologische Mededelingen* 32(1): 157-182.
- 25 González-Carranza Z, Berrío JC, Hooghiemstra H, Duivenvoorden JF, Behling H (2008). Changes of seasonally dry forest in the Colombian Patía Valley during the early and middle Holocene and the development of a dry climatic record for the northernmost Andes. *Review of Palaeobotany and Palynology* 152, 1–10. doi:10.1016/j.revpalbo.2008.03.005
- 26 Gosling WD, Hanselman JA, Knox C, Valencia BG, Bush MB (2009). Long-term drivers of change in *Polylepis* woodland distribution in the central Andes. *Journal of Vegetation Science* 20(6): 1041-1052. [DOI: 10.1111/j.1654-1103.2009.01102.x]
- 27 Gosling WD, Bush MD, Hanselman JA, Chepstow-Lusty A (2008). Glacial-interglacial changes in moisture balance and the impact on vegetation in the southern hemisphere tropical Andes (Bolivia/Peru). *Palaeogeography, Palaeoclimatology, Palaeoecology* 259(1): 35-50. [DOI: 10.1016/j.palaeo.2007.02.050]
- 28 Groot MHM, Bogotá RG, Lourens LJ, Hooghiemstra H, Vriend M, Berrío JC, Tuenter E, Van der Plicht J, Van Geel B, Ziegler M, Weber SL, Betancourt A, Contreras L, Gaviria S, Giraldo C, González N, Jansen JHF, Konert M, Ortega D, Rangel O, Sarmiento G, Vandenberghe J, Van der Hammen T, Van der Linden M, Westerhoff W (2011). Ultra-high resolution pollen record from the northern Andes reveals rapid shifts in montane climates within the last two glacial cycles. *Climate of the Past* 7: 299-316. [DOI: 10.5194/cp-7-299-2011]
- 29 Hanselman JA, Bush MB, Gosling WD, Collins A, Knox C, Baker P, Fritz SC (2011). A 370,000-year record of vegetation and fire history around Lake Titicaca (Bolivia/Peru). *Palaeogeography, Palaeoclimatology, Palaeoecology* 305(1-4): 201-214. [DOI: 10.1016/j.palaeo.2011.03.002]
- 30 Hanselman JA, Gosling WD, Paduano GM, Bush MB (2005). Contrasting pollen histories of MIS 5e and the Holocene from Lake Titicaca (Bolivia/Peru). *Journal of Quaternary Science* 20(7-8): 663-670. [DOI: 10.1002/jqs.979]
- 31 Helmens KF (1990). Neogene-Quaternary geology of the high plain of Bogotá, Eastern Cordillera, Colombia (stratigraphy, paleoenvironments and landscape evolution). Doctoral dissertation. University of Amsterdam, Amsterdam, The Netherlands.
- 32 Helmens KF, Kuhry P (1986). Middle and late Quaternary vegetational and climatic history of the paramo de Agua Blanca Eastern Cordillera, Colombia). *Palaeogeography, palaeoclimatology, palaeoecology* 56(3-4): 291-335. [DOI: 10.1016/0031-0182(86)90100-8]
- 33 Hodell DA, Anselmetti FS, Ariztegui D, Brenner M, Curtis JH, Gilli A, Grzesik DA, Guilderson TP, Müller AD, Bush MB, Correa-Metrio A, Escobar J, Kutterolf S (2008). An 85-ka record of climate change in lowland Central America. *Quaternary Science Reviews* 27(11-12): 1152-1165. [DOI: 10.1016/j.quascirev.2008.02.008]

- 34 Hooghiemstra H, Ran ETH (1994). Late and middle Pleistocene climatic change and forest development in Colombia: pollen record Funza II (2-158 m core interval). *Palaeogeography, Palaeoclimatology, Palaeoecology* 109(2-4): 211-246. [DOI: 10.1016/0031-0182(94)90177-5]
- 35 Kuhry P (1988). Palaeobotanical-palaeoecological studies of tropical high Andean peatbog sections (Cordillera Oriental, Colombia). *Dissertationes Botanicae* 116. J. Cramer, Berlin, Germany.
- 36 Melief A (1985). Late Quaternary paleoecology of the Parque Nacional Natural los Nevados (Cordillera Central) and Sumapaz (Cordillera Oriental) areas, Colombia. Ph.D. dissertation. University of Amsterdam, Amsterdam, The Netherlands, 162 pp.
- 37 Melief A, Cleef AM (2008). Results of the pollen analysis of peat and lake deposits in the Sumapaz area. In: T. van der Hammen, J.O. Rangel, A.M. Cleef (eds.), *La Cordillera Oriental Colombiana, Transecto Sumapaz, Studies on Tropical Andean Ecosystems/Estudios de Ecosistemas Tropandinos*, Vol. 7, pp. 395-485, Cramer Borntraeger, Berlin/Stuttgart, Germany.
- 38 Melief ABM (1985). Late Quaternary paleoecology of the Parque Nacional Natural los Nevados (Cordillera Central), and Sumapaz (Cordillera Oriental) areas, Colombia. Doctoral dissertation. Universiteit van Amsterdam, Amsterdam, The Netherlands.
- 39 Melief ABM, Cleef AM (2008). Results of the pollen analysis of peat and lake deposits in the Sumapaz area. Pages 395-452 in T. van der Hammen, J.O. Rangel, and A.M. Cleef, editors. *La Cordillera Oriental Colombiana Transecto Sumapaz. Studies on Tropical Andean Ecosystems* 7. J. Cramer, Berlin, Germany.
- 40 Mueller AD, Anselmetti FS, Ariztegui D, Brenner M, Hodell DA, Curtis JH, Escobar J, Gilli A, Grzesik AD, Guilderson TP, Kutterolf S, Plötze M (2010). Late Quaternary palaeoenvironment of northern Guatemala: evidence from deep drill cores and seismic stratigraphy of Lake Petén Itzá. *Sedimentology* 57(5): 1220-1245. [DOI: 10.1111/j.1365-3091.2009.01144.x]
- 41 Thouret JC, Salinas R, Murcia A (1990). Eruption and mass-wasting-induced processes during the late Holocene destructive phase of Nevado del Ruiz volcano, Colombia. *Journal of Volcanology and Geothermal Research* 41(1-4): 203-224. [DOI: 10.1016/0377-0273(90)90089-x]
- 42 Thouret JC, Van der Hammen T, Juvigné E, Salomons JB (1995). Geología del Cuaternario reciente en el Macizo Volcanico del Ruiz-Tolima (Cordillera Central). Pages 183-239 in T. van der Hammen and A.G. dos Santos, editors. *La Cordillera Central Colombiana transecto Parque Los Nevados (tercera parte). Studies on tropical Andean ecosystems/Estudios de Ecosistemas Tropandinos* 4. J. Cramer, Berlin, Germany.
- 43 Tomos M (2008). *Volcanism & Climate in the central Andes: the tephra record from Lake Titicaca*. Master's thesis. University of Oxford, Oxford, United Kingdom. Notes: Supervisors: D.M. Pyle & W.D. Gosling
- 44 Urrego DH, Niccum BA, La Drew CF, Silman MR, Bush MB (2011). Fire and drought as drivers of early Holocene tree line changes in the Peruvian Andes. *Journal of Quaternary Science* 26(1): 28-36. [DOI: 10.1002/jqs.1422]
- 45 Urrego DH, Bush MB, Silman MR, Niccum BA, De la Rosa P, McMichael CH, Hagen S, Palace M (2013). Holocene fires, forest stability and human occupation in south-western Amazonia. *Journal of Biogeography* 40(3): 521-533. [DOI: 10.1111/jbi.12016]
- 46 Urrego LE, Berrio JC (2011). Los estudios paleoecológicos en el Chocó biogeográfico durante el Holoceno medio y reciente. Pages 23-38 in J.O. Rangel, editor. *Colombia Diversidad Biótica IV, El Chocó biogeográfico/Costa Pacífica*. Universidad Nacional de Colombia, Conservación Internacional, Bogotá D.C., Colombia.
- 47 Van der Hammen T (1962). Palinología de la region de "Laguna de los Bobos": Historia de su clima, vegetacion y agricultura durante los ultimos 5.000 años. *Revista de la Academia Colombiana de Ciencias Exactas, Físicas y Naturales* 11(44):359-361.
- 48 Van der Hammen T, Barelds J, De Jong H, De Veer AA (1981). Glacial sequence and environmental history in the Sierra Nevada del Cocuy (Colombia). *Palaeogeography, Palaeoclimatology, Palaeoecology* 32: 247-340. [DOI: 10.1016/0031-0182(80)90043-7]
- 49 Van der Hammen T, Cleef AM, Noldus GW (1995). A palynological record of the Rosarito pedo-tephro stratigraphical sequence (Central Cordillera, Colombia): vegetational history of the last 35,000 years. Pages 431-440 in T. van der Hammen and A.G. dos Santos, editors. *La Cordillera Central Colombiana transecto Parque Los Nevados (tercera parte). Studies on tropical Andean ecosystems/Estudios de Ecosistemas Tropandinos* 4. J. Cramer, Berlin, Germany.

- 50 Van der Hammen T, Gonzalez E (1965). A Late-glacial and Holocene pollen diagram from Ciénaga del Visitador (Dept. Boyaca, Colombia). *Leidse Geologische Mededelingen* 32: 193-201.
- 51 Van der Hammen T, Gonzalez E (1965). A pollen diagram from "Laguna de la Herrera" (Sabana de Bogota). *Leidse Geologische Mededelingen* 32(1): 183-191.
- 52 Van der Hammen T, Hooghiemstra H (1997). Chronostratigraphy and correlation of the Pliocene and Quaternary of Colombia. *Quaternary International* 40: 81-91. [DOI: 10.1016/S1040-6182(96)00064-X]
- 53 Van der Hammen T, Hooghiemstra H, (1995). The El Abra stadial, a Younger Dryas equivalent in Colombia. *Quaternary Science Reviews* 14: 841–851.
- 54 van der Hammen, T., J. Barelds, H. de Jong, and A.A. de Veer. 1981. Glacial sequence and environmental history in the Sierra Nevada del Cocuy (Colombia). *Palaeogeography, Palaeoclimatology, Palaeoecology* 32:247-340. [DOI: 10.1016/0031-0182(80)90043-7]
- 55 Van der Hammen T, Noldus GW (1984). Paleoeología de la Ciénaga Grande de Santa Marta (Paleoecology of the Ciénaga Grande (Great Lagoon) of Santa Marta (Colombia). In: Van der Hammen, T, Ruiz, P.M. (eds.), *Studies on Tropical Andean Ecosystems/Estudios de Ecosistemas Tropandinos*, Vol. 2, pp. 581-588.
- 56 Van Geel B, Van der Hammen T (1973). Upper Quaternary vegetational and climatic sequence of the Fuquene area (Eastern Cordillera, Colombia). *Palaeogeography, Palaeoclimatology, Palaeoecology* 14(1): 9-92. [DOI: 10.1016/0031-0182(73)90064-3]
- 57 Van 't Veer R, Islebe GA, Hooghiemstra H (2000). Climatic change during the Younger Dryas chron in northern South America: a test of the evidence. *Quaternary Science Reviews* 19(17-18): 1821-1835. [DOI: 10.1016/S0277-3791(00)00093-7]
- 58 Vélez Caicedo MI (2003). A contribution of diatom analysis to Lateglacial and Holocene environmental reconstructions of Colombian lowland and montane ecosystems. Doctoral dissertation. University of Amsterdam, Amsterdam, The Netherlands.
- 59 Vélez MI, Berrio JC, Hooghiemstra H, Metcalfe S, Marchant R (2005). Palaeoenvironmental changes during the last ca. 8590 calibrated yr (7800 radiocarbon yr) in the dry forest ecosystem of the Patía Valley, Southern Colombian Andes: a multiproxy approach. *Palaeogeography, Palaeoclimatology, Palaeoecology* 216(3-4): 279-302. [DOI: <https://doi.org/10.1016/j.palaeo.2004.11.006>]
- 60 Vélez MI, Wille M, Hooghiemstra H, Metcalfe S, Vandenbergh J, Van der Borg K (2001). Late Holocene environmental history of southern Chocó region, Pacific Colombia, sediment, diatom and pollen analysis of core El Caimito. *Palaeogeography Palaeoclimatology Palaeoecology* 173: 197–214.
- 61 Vogel JC, Lerman JC. 1969. Groningen radiocarbon dates VIII. *Radiocarbon* 11(2):351-390. [DOI: 10.1017/S0033822200011279]
- 62 Wille M (2001). Vegetation history and climate records of Colombian lowland areas: rain forest, savanna and intermontane ecosystems. Doctoral dissertation. University of Amsterdam, Amsterdam, The Netherlands.
- 63 Wille M, Hooghiemstra H, Van Geel B, Behling H, De Jong A, Van der Borg K (2003). Submillennium-scale migrations of the rainforest–savanna boundary in Colombia: 14C wiggle-matching and pollen analysis of core Las Margaritas. *Palaeogeography, Palaeoclimatology, Palaeoecology* 193(2): 201-223. [DOI: 10.1016/S0031-0182(03)00226-8]
- 64 Wille M, Hooghiemstra H, Behling H, Van der Borg K, Negret AJ (2001). Environmental change in the Colombian subandean forest belt from 8 pollen records: the last 50 kyr. *Vegetation History and Archaeobotany* 10(2): 61-77. [DOI: 10.1007/PL00006921]
- 65 Wille M, Negret AJ, Hooghiemstra H (2000). Paleoenvironmental history of the Popayán area since 27 000 yr BP at Timbio, southern Colombia. *Review of Palaeobotany and Palynology* 109(1): 45-63. [DOI: [http://doi.org/10.1016/S0034-6667\(99\)00047-0](http://doi.org/10.1016/S0034-6667(99)00047-0)]

Appendix 1a: Excel worksheet Metadata

This worksheet contains the metadata for the core. The labels explain which type of metadata it is.

	A	B	C	D	E	F	G	H	I	J	K	L
1	METADATA											
2												
3	Site description											
4												
5	Site Name:	Laguna De La Cocha										
6												
7	Latitude:	1.12										
8	Longitude:	-77.15										
9	Altitude (m):	2780										
10												
11	Area of Site (ha):	4200										
12												
13	Site Description:	La Cocha lies in a tectonic "pull-apart" basin formed along the Algeciras fault system. The lake lies in the Andean forest zone with frequent elements of Weinmannia, Alnus, Myrica, Styloceras, Podocarpus, Clusia, Myrsine, Juglans, Ilex, and Hedyosmum. Today most forest has been replaced by pasture, meadows, and agricultural fields. Forest remnants are dominated by Ocotea guianensis and Weinmannia pubescens. The shrubs Miconia harlineii and Miconia sp. along with the ferns Ascotrichyllum arborium, Polypodium, Anthurium and Cavendishia.										
14												
15												
16												
17	Collection Unit											
18												
19	Handle:	Collection Unit Type:		Collection Unit Name:								
20	LACCHA3	Core		C-3								
21												
22	Collection Device:	Collectors:										
23	Russian corer (7 cm diameter)	Berrio Mogollón, J.C.; González-Carranza, Z.										
24	Location in Site:	Date Collected:										
25		May 2006										
26												
27	GPS Coordinates	Error (m):		Depositional Environment:								
28	Latitude:			Lake Marginal Fen								
29	Longitude:			Substrate:								
30	Altitude (m):			Slope Angle (degrees):				Slope Aspect (degrees):				
31												
32												
33	Collection Unit Notes:	Water Depth (m):										
34	Core is from a large wetland on the north end of Laguan De La Cocha.											
35												
36												
37												
38	Dataset											
39												
40	Dataset Type:	Data Processors:										
41	Pollen inventory	Grimm, E.C.										
42												
43	Dataset Name:											
44												
45	Investigators:											
46	Epping, I; González-Carranza, Z.											
47	Publications:											
48	Epping 2009											
49												
50	Dataset Notes:											
51												
52												
53												
54												
55	Publications											
56												
57	Primary	Publication										
58	<input checked="" type="checkbox"/>	Epping, I. 2009. Environmental change in the Colombian upper forest belt. Master's thesis. University of Amsterdam, Amsterdam, The Netherlands.										
59												

Appendix 1b: Metadata as a CSV file

The image to the left shows what the CSV file for the metadata looks like.

The image below is a screenshot that shows what the CSV data look like when they are imported it into a spreadsheet. It will need a bit of formatting to be able to read the longer texts.

```

Listner - [H:\_2017_DANS_ArchivingPollenData\DANS-2017_UploadFolder\Colombia\COL_LACCOCHA3_2006]
File Edit Options Help
;METADATA;;;;;;;;;;;;;
;Site description;;;;;;;;;;;;;
;Site Name;;Laguna De La Cocha;;Country;;;Colombia;;
;Department;;;Nariño;;
;Latitude;;;1.12;;Third Geop Division;;;;;;;;;
;Longitude;;;-77.15;;Administrative Unit;;;;;;;;;
;Altitude (m);;2780;;;;;;;;;
;Area of Site (ha);;4200;;Lake Parameters;;;;;;;;;
;Site Description;;;;;;;;;Site Notes;;;;;;;;;
;"La Cocha lies in a tectonic "pull-apart" basin formed along the Alge
fault system. The lake lies in the Andean forest zone with frequent elem
Weinmannia, Alnus, Myrica, Styloceras, Podocarpus, Clusia, Myrsine, Jugl
Ilex, and Hedysmum. Today most forest has been replaced by pasture, mead
agricultural fields. Forest remnants are dominated by Ocotea guianensis
Weinmannia pubescens. The shrubs Miconia harlineii and Miconia sp. along
ferns Ascotrichyium arborium, Polypodium, Anthurium and Cavendishia.";;;
site includes large wetland on north end. Lake data derived from Duque-Trujillo,
J., M. Hermelin, and G.F. Toro. 2016. The Guamuéz (La Cocha) Lake. In:
Landscapes and landforms of Colombia, pp. 203-210 ( M. Hermelin, ed.) World
geomorphological landscapes. Springer, Cham, Switzerland. DOI:
10.1007/978-3-319-11800-0_17.;;;;;
;Collection Unit;;;;;;;;;;;;;
;Handle;;Collection Unit Type;;;Collection Unit Name;;;;;;;;;
;LACCOCHA3;Core;;;C-3;;;;;;;;;
;Collection Device;;;;;;;;;Collectors;;;;;;;;;
;Russian corer (? cm diameter);;;;;;;;;"Berrio Mogollón, J.C.; González-Carranza,
Z.";;;;;;;;;
;Location in Site;;;;;;;;;Date Collected
;May 2006;;;;;;;;;
;GPS Coordinates;;;Error (m);;Deposi
;Latitude;;;1.145;;Lake Marginal Fen
;Longitude;;;-77.160;;Substrate;;;
;Altitude (m);;2780;;;;;;;;;
;Slope Angle (degrees);;Slope
;Collection Unit Notes;;;;;;;;;Water Dep
;Core is from a large wetland on the n
Cocha.;;;;;;;;;
;Dataset;;;;;;;;;;;;;
;Dataset Type;;;;;;;;;;;;;
;Pollen inventory;;;;;;;;;;;;;
;Dataset Name;;;;;;;;;;;;;
;Investigators;;;;;;;;;;;;;
;"Epping, I; González-Carranza, Z.;;;
;Publications;;;;;;;;;;;;;
;Epping 2009;;;;;;;;;;;;;
;Dataset Notes;;;;;;;;;Data Processors;;
;Grimm, E.C.;;;;;;;;;
;Publications;;;;;;;;;;;;;
;Primary;Publication;;;;;;;;;;;;;
;x;Epping, I. 2009. Environmental chan
Master's thesis. University of Amsterd

```

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1		METADATA												
2														
3		Site description												
4		Site Name:	Laguna De La Cocha				Country:			Colombia				
5							Department:			Nariño				
6		Latitude:	1.12				Third Geop Division:							
7		Longitude:	-77.15				Administrative Unit:							
8		Altitude (m):	2780											
9														
10		Area of Site (ha):	4200				Lake Parameters:							
11														
12		Site Description:					Site Notes:							
13		La Cocha lies in a tectonic "pull-apart" basin formed along the					Lake site includes large wetland on north end. Lake data derived from D							
14														
15		Collection Unit												
16														
17		Handle:	Collection Unit Type:				Collection Unit Name:							
18		LACCOCHA3	Core				C-3							
19		Collection Device:					Collectors:							
20		Russian corer (? cm diameter)					Berrio Mogollón, J.C.; González-Carranza, Z.							
21		Location in Site:					Date Collected:							
22							May 2006							
23		GPS Coordinates				Error (m):	Depositional Environment:							
24		Latitude:	1.145				Lake Marginal Fen							
25		Longitude:	-77.16				Substrate:							
26		Altitude (m):												
27							Slope Angle (degrees):			Slope Aspect (degrees):				
28														
29		Collection Unit Notes:					Water Depth (m):							
30		Core is from a large wetland on the north end of Laguan De La Cocha.												
31														
32		Dataset												
33														
34		Dataset Type:												
35		Pollen inventory												
36														
37		Dataset Name:												
38														
39		Investigators:												
40		Epping, I; González-Carranza, Z.												
41		Publications:												
42		Epping 2009												
43														
44		Dataset Notes:					Data Processors:							
45							Grimm, E.C.							
46														
47		Publications												
48														
49		Primary	Publication											
50		x	Epping, I. 2009. Environmental change in the Colombian upper forest belt. Master's thesis. University of Amsterdam, Amster											
51														
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Appendix 2a: Excel worksheet Raw_data

	A	B	C	D	E	F	G	H	I	J	K	L	
1	pollen					Depth (cm)							
2	Code	Name	Element	Units	Group	1	3	5	7	9	11	13	
3	#Chron1	Clam best age				-23	-13	-3	6	16	26	35	
4	#Chron1.Young	Clam min age				-84	-79	-73	-68	-64	-59	-54	
5	#Chron1.Old	Clam max age				18	30	42	55	68	80	93	
6	#Chron2	Clam best age				100	106	111	116	121	127	132	
7	#Chron2.Young	Clam min age				-181	-170	-159	-148	-137	-126	-115	
8	#Chron2.Old	Clam max age				277	278	280	282	283	284	285	
9	#Chron3	Bacon weighted mean age	PREFERRED			-51	-41	-31	-20	-10	1	11	
10	#Chron3.Young	Bacon min age				-57	-57	-56	-56	-55	-52	-49	
11	#Chron3.Old	Bacon max age				-41	-11	19	49	79	98	105	
12	#Anal.Thick	Analysis Unit Thickness				1	1	1	1	1	1	1	
13	#Samp.Analyst	Sample Analyst				Epping, I.	Epping, I.	Epping, I.	Epping, I.	Epping, I.	Epping, I.	Epping, I.	
14	samp.quant	Sample quantity	volume	ml	LABO	1	1	1	1	1	1	1	
15	Lyc.tab	Lycopodium tablets	quantity added	number	LABO	1	1	1	1	1	1	1	
16	Lyc.tab	Lycopodium tablets	concentration	grains/tablet	LABO	12542	12542	12542	12542	12542	12542	12542	
17	Lyc.spik	Lycopodium spike	counted	number	LABO	366	142	180	214	116	204	127	
18	Areaceae.ud	Arecaceae undiff.	pollen	NISP	PALM	0	0	0	0	0	0	0	
19	Cey-t	Ceroxylon-type	pollen	NISP	PALM	0	0	0	0	0	0	0	
20	Alc	Alchornea	pollen	NISP	TRSH	0	0	0	0	0	0	0	
21	Ahr	Alchorneopsis	pollen	NISP	TRSH	0	0	0	0	0	0	0	
22	Aln	Alnus	pollen	NISP	TRSH	0	0	0	1	0	0	0	
23	Anaeae	Anacardiaceae	pollen	NISP	TRSH	0	0	0	0	0	0	0	
24	Bigeae	Bignoniaceae	pollen	NISP	TRSH	0	0	0	0	0	0	0	
25	Bri-t	Brunellia-type	pollen	NISP	TRSH	0	0	0	0	0	0	0	
26	Clseae	Celastraceae	pollen	NISP	TRSH	0	0	0	0	0	0	0	
27	Cle	Clethra	pollen	NISP	TRSH	1	0	0	0	0	0	0	
28	Clu-t	Clusia-type	pollen	NISP	TRSH	0	0	0	0	0	0	0	
29	Erceae	Ericaceae	pollen	NISP	TRSH	2	16	8	5	3	5	5	
30	Gaa	Gaiadendron	pollen	NISP	TRSH	0	0	0	0	0	0	0	
31	Hdm	Hedyosmum	pollen	NISP	TRSH	5	11	14	3	7	11	4	
32	Ilx	Ilex	pollen	NISP	TRSH	0	0	0	0	0	0	0	
33	Mlaeae.ud	Melastomataceae undiff.	pollen	NISP	TRSH	6	11	8	14	11	3	11	
34	Mco	Miconia	pollen	NISP	TRSH	23	35	29	32	68	22	67	
35	Myr	Myrica	pollen	NISP	TRSH	56	21	50	53	52	54	53	
36	Mrs	Myrsine	pollen	NISP	TRSH	0	0	0	0	0	0	0	
37	Pre-t	Pera-type	pollen	NISP	TRSH	0	0	0	0	0	0	0	
38	Pod	Podocarpus	pollen	NISP	TRSH	1	5	3	1	1	2	0	
39	Prieae.sf.Mrsdae.ud	Primulaceae subf. Myrsinoideae undiff.	pollen	NISP	TRSH	1	0	1	2	0	0	0	
40	Psy	Psychotria	pollen	NISP	TRSH	13	6	4	7	3	7	8	
41	Que	Quercus	pollen	NISP	TRSH	0	0	0	0	0	0	0	
42	Rubeae.ud	Rubiaceae undiff.	pollen	NISP	TRSH	0	0	0	0	0	0	0	
43	Spm	Sapium	pollen	NISP	TRSH	0	0	0	0	0	0	0	
44	Syp	Symplocos	pollen	NISP	TRSH	1	2	3	2	0	0	0	
45	Urteae/Moreae	Urticaceae/Moraceae	pollen	NISP	TRSH	3	2	10	2	3	0	2	
46	Vil	Vallea	pollen	NISP	TRSH	1	0	0	0	0	0	0	
47	Vib	Viburnum	pollen	NISP	TRSH	0	0	0	0	0	0	0	
48	Wei	Weinmannia	pollen	NISP	TRSH	4	12	13	12	11	4	15	
49	Acy	Acalypha	pollen	NISP	UPHE	0	1	3	3	3	0	0	
50	Amæae	Amaranthaceae	pollen	NISP	UPHE	0	0	0	0	0	0	0	
51	Amreeae	Amaryllidaceae	pollen	NISP	UPHE	1	1	0	0	0	0	0	
52	Atu	Anthurium	pollen	NISP	UPHE	3	4	2	3	0	0	2	
53	Apiæae	Apiaceae	pollen	NISP	UPHE	0	0	0	0	0	0	0	
54	Apoeae	Apocynaceae	pollen	NISP	UPHE	0	0	0	0	0	0	0	
55	Astaeae.sf.Astdae	Asteraceae subf. Asteroideae	pollen	NISP	UPHE	71	120	117	118	114	125	112	

The first row lists the depths at which the samples were taken.

The second row only has the column headers for columns A-E.

Then follow the ages as determined by the different chronologies. In this example the third chronology is considered the preferred chronology (as indicated).

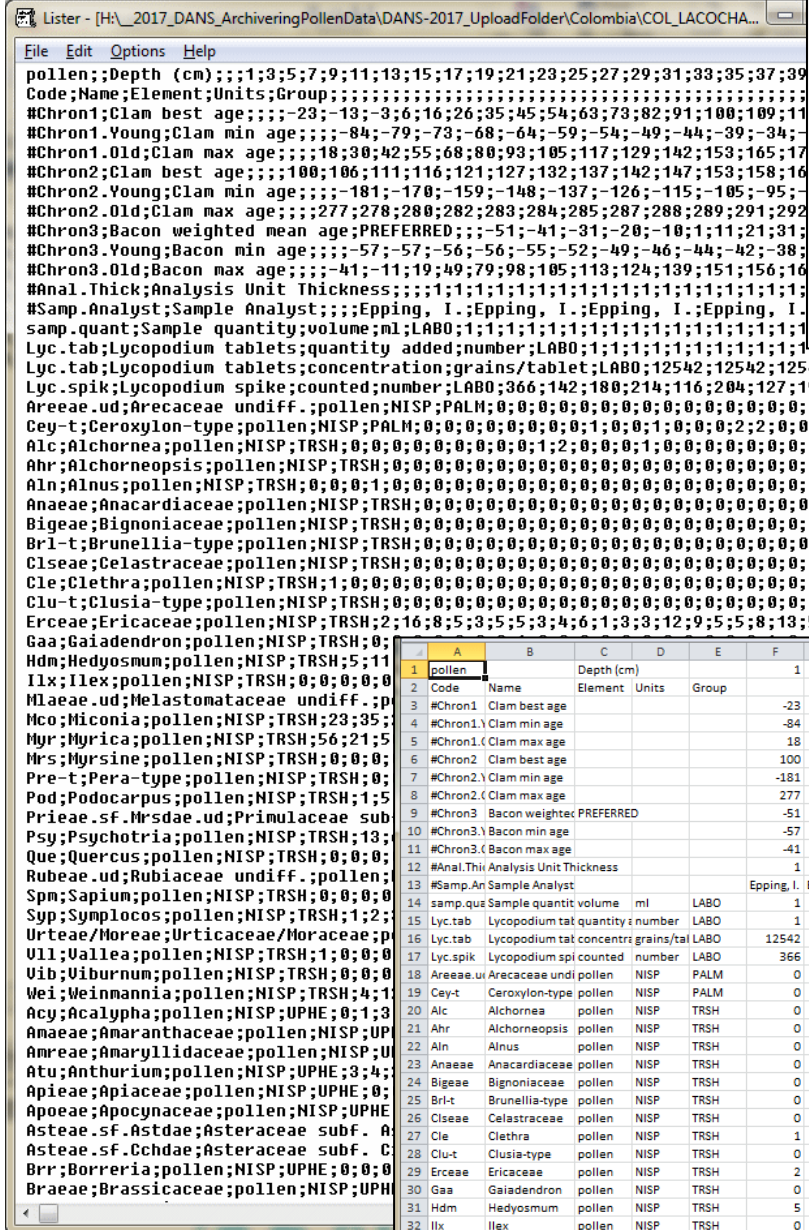
After a few rows on the Sample Analyst and the added lycopodium tablets follow the pollen counts. There are much more rows below and columns to the right, which are not shown in the screenshot.

Note: When summing the total number of pollen grains and spores that were identified, the rows "Sample quantity" up to "Lycopodium spike" were not included.

Appendix 2b: Raw data as a CSV file

The image to the left shows the CSV file for the raw data.

The image below is what it looks like when you import the CSV file into a spreadsheet. In order to be able to read the full taxon names one would have to widen column B.



	A	B	C	D	E	F	G	H	I	J	K	L	M
1	pollen		Depth (cm)			1	3	5	7	9	11	13	15
2	Code	Name	Element	Units	Group								
3	#Chron1	Clam best age				-23	-13	-3	6	16	26	35	45
4	#Chron1	Clam min age				-84	-79	-73	-68	-64	-59	-54	-49
5	#Chron1	Clam max age				18	30	42	55	68	80	93	105
6	#Chron2	Clam best age				100	106	111	116	121	127	132	137
7	#Chron2	Clam min age				-181	-170	-159	-148	-137	-126	-115	-105
8	#Chron2	Clam max age				277	278	280	282	283	284	285	287
9	#Chron3	Bacon weighted mean age	PREFERRED			-51	-41	-31	-20	-10	1	11	21
10	#Chron3	Bacon min age				-57	-57	-56	-56	-55	-52	-49	-46
11	#Chron3	Bacon max age				-41	-11	19	49	79	98	105	113
12	#Anal.Thi	Analysis Unit Thickness				1	1	1	1	1	1	1	1
13	#Samp.An	Sample Analyst				Epping, I.	Epping, I.	Epping, I.	Epping, I.	Epping, I.	Epping, I.	Epping, I.	Epping, I.
14	samp.quant	Sample quantity	volume	ml	LABO	1	1	1	1	1	1	1	1
15	Lyc.tab	Lycopodium tab	quantity	number	LABO	1	1	1	1	1	1	1	1
16	Lyc.spik	Lycopodium spik	counted	number	LABO	12542	12542	12542	12542	12542	12542	12542	12542
17	Lyc.tab	Lycopodium tab	concentr	grains/ta	LABO	366	142	180	214	116	204	127	195
18	Arceae.ud	Arceaceae undiff.	pollen	NISP	PALM	0	0	0	0	0	0	0	0
19	Cey-t	Ceroxylon-type	pollen	NISP	PALM	0	0	0	0	0	0	0	0
20	Alc	Alchornea	pollen	NISP	TRSH	0	0	0	0	0	0	0	0
21	Ahr	Alchorneopsis	pollen	NISP	TRSH	0	0	0	0	0	0	0	0
22	Aln	Alnus	pollen	NISP	TRSH	0	0	0	1	0	0	0	0
23	Anaeae	Anacardiaceae	pollen	NISP	TRSH	0	0	0	0	0	0	0	0
24	Bigae	Bignoniaceae	pollen	NISP	TRSH	0	0	0	0	0	0	0	0
25	Br1-t	Brunellia-type	pollen	NISP	TRSH	0	0	0	0	0	0	0	0
26	Clseae	Celastraceae	pollen	NISP	TRSH	0	0	0	0	0	0	0	0
27	Cle	Clethra	pollen	NISP	TRSH	1	0	0	0	0	0	0	0
28	Clu-t	Clusia-type	pollen	NISP	TRSH	0	0	0	0	0	0	0	0
29	Erceae	Ericaceae	pollen	NISP	TRSH	2	16	8	5	3	5	5	3
30	Gaa	Gaiadendron	pollen	NISP	TRSH	0	0	0	0	0	0	0	1
31	Hdm	Hedyosmum	pollen	NISP	TRSH	5	11	14	3	7	11	4	7
32	Ilx	Ilex	pollen	NISP	TRSH	0	0	0	0	0	0	0	0
33	Mlaee	Melastomataceae	pollen	NISP	TRSH	6	11	8	14	11	3	11	6
34	Mco	Miconia	pollen	NISP	TRSH	23	35	29	32	68	22	67	36
35	Myr	Myrica	pollen	NISP	TRSH	56	21	50	53	52	54	53	100
36	Mrs	Myrsine	pollen	NISP	TRSH	0	0	0	0	0	0	0	0
37	Pre-t	Pera-type	pollen	NISP	TRSH	0	0	0	0	0	0	0	0
38	Pod	Podocarpus	pollen	NISP	TRSH	1	5	3	1	1	2	0	2
39	Prieae.sf	Primulaceae sub	pollen	NISP	TRSH	1	0	1	2	0	0	0	1
40	Psy	Psychotria	pollen	NISP	TRSH	13	6	4	7	3	7	8	8
41	Que	Quercus	pollen	NISP	TRSH	0	0	0	0	0	0	0	0
42	Rubeae.u	Rubiaceae undiff.	pollen	NISP	TRSH	0	0	0	0	0	0	0	0
43	Spm	Sapium	pollen	NISP	TRSH	0	0	0	0	0	0	0	0
44	Syp	Symplocos	pollen	NISP	TRSH	1	2	3	2	0	0	0	1
45	Urteae/M	Urticaceae/Mo	pollen	NISP	TRSH	3	2	10	2	3	0	2	5
46	Vll	Vallea	pollen	NISP	TRSH	1	0	0	0	0	0	0	0
47	Vib	Viburnum	pollen	NISP	TRSH	0	0	0	0	0	0	0	0
48	Wei	Weinmannia	pollen	NISP	TRSH	4	12	13	12	11	4	15	9
49	Acy	Acalypha	pollen	NISP	UPHE	0	1	3	3	3	0	0	4
50	Ameeae	Amaranthaceae	pollen	NISP	UPHE	0	0	0	0	0	0	0	0
51	Amree	Amaryllidaceae	pollen	NISP	UPHE	1	1	0	0	0	0	0	0
52	Atu	Anthurium	pollen	NISP	UPHE	3	4	2	3	0	0	2	3
53	Apiiae	Apiaceae	pollen	NISP	UPHE	0	0	0	0	0	0	0	0
54	Apoeae	Apocynaceae	pollen	NISP	UPHE	0	0	0	0	0	0	0	0
55	Asteae.sf	Asteraceae sub	pollen	NISP	UPHE	71	120	117	118	114	135	112	118
56	Asteae.sf	Asteraceae sub	pollen	NISP	UPHE	0	2	0	1	0	1	0	1
57	Brr	Borreria	pollen	NISP	UPHE	0	0	0	0	0	0	0	0
58	Braee	Brassicaceae	pollen	NISP	UPHE	0	1	0	0	0	0	1	0
59	Ccl	Calceolaria	pollen	NISP	UPHE	0	0	0	0	0	0	0	0

Appendix 3a: Excel worksheets Geochronology and Chronologies

In the ASCII files both the worksheet "Geochronology" and "Chronologies" appear in the CSV files marked by the abbreviation CHRON.

The worksheet "Geochronology" specifies the radio carbon dates (in radiocarbon years) as they were determined in the lab by ¹⁴C dating. The worksheet "Chronologies" specifies which dates were actually used in the different chronologies.

GEOCHRONOLOGY												
Investigators: Epping, I.; González-Carranza, Z.			Notes:									
Method	Age Units	Depth (cm)	Thickness (cm)	Lab Number	Age	SD	Params	Material Dated	Publication	Notes		
Carbon-14	Radiocarbon years BP	35	1	GrA-35558	220	30	Method:AMS	bulk sediment				
Carbon-14	Radiocarbon years BP	122	1	GrA-40162	370	30	Method:AMS	bulk sediment				
Carbon-14	Radiocarbon years BP	270	1	GrA-35562	1685	35	Method:AMS	bulk sediment				
Carbon-14	Radiocarbon years BP	830	1	GrA-35560	7640	40	Method:AMS	bulk sediment				
Carbon-14	Radiocarbon years BP	1046	1	GrA-35561	11760	50	Method:AMS	bulk sediment		Date not in Epping (2009).		

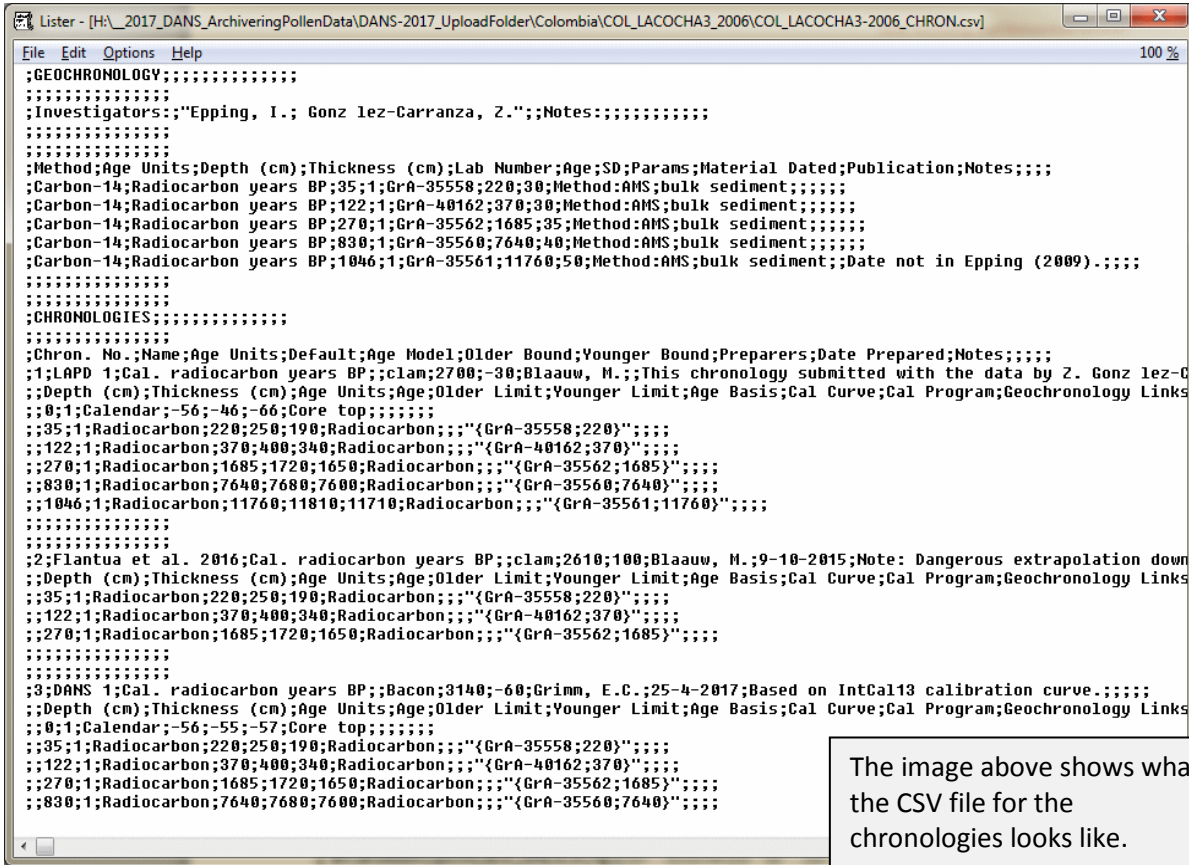
CHRONOLOGIES												
Chron. No.	Name	Age Units	Default	Age Model	Older Bound	Younger Bound	Preparers	Date Prepared	Notes			
1	LAPD 1	Cal. radiocarbon years BP		clam	2700	-30	Blaauw, M.		This chronology submitted with the data by Z. González-Carranza.			
		Depth (cm)	Thickness (cm)	Age Units	Age	Older Limit	Younger Limit	Age Basis	Cal Curve	Cal Program	Geochronology Links	Notes
		0	1	Calendar	-56	-46	-66	Core top				
		35	1	Radiocarbon	220	250	190	Radiocarbon			{GrA-35558;220}	
		122	1	Radiocarbon	370	400	340	Radiocarbon			{GrA-40162;370}	
		270	1	Radiocarbon	1685	1720	1650	Radiocarbon			{GrA-35562;1685}	
		830	1	Radiocarbon	7640	7680	7600	Radiocarbon			{GrA-35560;7640}	
		1046	1	Radiocarbon	11760	11810	11710	Radiocarbon			{GrA-35561;11760}	
2	Flantua et al. 2016	Cal. radiocarbon years BP		clam	2610	100	Blaauw, M.	9-10-2015	Note: Dangerous extrapolation downward. Unreliable ages. Calibr			
		Depth (cm)	Thickness (cm)	Age Units	Age	Older Limit	Younger Limit	Age Basis	Cal Curve	Cal Program	Geochronology Links	Notes
		35	1	Radiocarbon	220	250	190	Radiocarbon			{GrA-35558;220}	
		122	1	Radiocarbon	370	400	340	Radiocarbon			{GrA-40162;370}	
		270	1	Radiocarbon	1685	1720	1650	Radiocarbon			{GrA-35562;1685}	
3	DANS 1	Cal. radiocarbon years BP		Bacon	3140	-60	Grimm, E.C.	25-4-2017	Based on IntCal13 calibration curve.			
		Depth (cm)	Thickness (cm)	Age Units	Age	Older Limit	Younger Limit	Age Basis	Cal Curve	Cal Program	Geochronology Links	Notes
		0	1	Calendar	-56	-55	-57	Core top				
		35	1	Radiocarbon	220	250	190	Radiocarbon			{GrA-35558;220}	
		122	1	Radiocarbon	370	400	340	Radiocarbon			{GrA-40162;370}	
		270	1	Radiocarbon	1685	1720	1650	Radiocarbon			{GrA-35562;1685}	
		830	1	Radiocarbon	7640	7680	7600	Radiocarbon			{GrA-35560;7640}	

In this example there are three chronologies.

1. The chronology by Maarten Blaauw, which was submitted with the data by Z. Gonzalez.
2. Apparently Flantua et al. (2016) found the last two dates not reliable and fitted a new age model (also with the help of Maarten Blaauw).
3. Eric Grimm considered the long downward extrapolation risky and included the ¹⁴C date at depth 830 cm and also inserted a date for the core top.

The latter chronology was considered the most reliable and was indicated as "PREFERRED" in the worksheet "Raw_data".

Appendix 3a: Geochronology and Chronologies as a CSV file



The image above shows what the CSV file for the chronologies looks like.

Below is what it looks like when you import it into a spreadsheet.

	A	B	C	D	E	F	G	H	I	J	K	
1		GEOCHRONOLOGY										
2												
3		Investigato Epping, I.; Gonz lez-C Notes:										
4												
5												
6		Method	Age Units	Depth (cm)	Thickness	Lab Numb	Age	SD	Params	Material Di	Publicatic	Notes
7		Carbon-14	Radiocart	35		1	GrA-3555	220	30	Method:A	bulk sediment	
8		Carbon-14	Radiocart	122		1	GrA-4016	370	30	Method:A	bulk sediment	
9		Carbon-14	Radiocart	270		1	GrA-3556	1685	35	Method:A	bulk sediment	
10		Carbon-14	Radiocart	830		1	GrA-3556	7640	40	Method:A	bulk sediment	
11		Carbon-14	Radiocart	1046		1	GrA-3556	11760	50	Method:A	bulk sediment	Date not in Epping (2009).
12												
13												
14		CHRONOLOGIES										
15												
16		Chron. No.	Name	Age Units	Default	Age Mode	Older Bou	Younger B	Preparers	Date Prepa	Notes	
17		1	LAPD 1	Cal. radiocarbon yea	clam		2700	-30	Blaauw, M.		This chronology submitted with the data by Z. Gonz lez-Carranza.	
18			Depth (cm)	Thickness	Age Units	Age	Older Lim	Younger L	Age Basis	Cal Curve	Cal Progr	Geochron Notes
19			0	1	Calendar	-56	-46	-66	Core top			
20			35	1	Radiocart	220	250	190	Radiocarbon			{GrA-35558;220}
21			122	1	Radiocart	370	400	340	Radiocarbon			{GrA-40162;370}
22			270	1	Radiocart	1685	1720	1650	Radiocarbon			{GrA-35562;1685}
23			830	1	Radiocart	7640	7680	7600	Radiocarbon			{GrA-35560;7640}
24			1046	1	Radiocart	11760	11810	11710	Radiocarbon			{GrA-35561;11760}
25												
26												
27		2	Flantua et al.	Cal. radiocarbon yea	clam		2610	100	Blaauw, M	9-10-2015	Note: Dangerous extrapolation downward. Unreliable ages. Calibrati	
28			Depth (cm)	Thickness	Age Units	Age	Older Lim	Younger L	Age Basis	Cal Curve	Cal Progr	Geochron Notes
29			35	1	Radiocart	220	250	190	Radiocarbon			{GrA-35558;220}
30			122	1	Radiocart	370	400	340	Radiocarbon			{GrA-40162;370}
31			270	1	Radiocart	1685	1720	1650	Radiocarbon			{GrA-35562;1685}
32												
33												
34		3	DANS 1	Cal. radiocarbon yea	Bacon		3140	-60	Grimm, E.	25-4-2017	Based on IntCal13 calibration curve.	
35			Depth (cm)	Thickness	Age Units	Age	Older Lim	Younger L	Age Basis	Cal Curve	Cal Progr	Geochron Notes
36			0	1	Calendar	-56	-55	-57	Core top			
37			35	1	Radiocart	220	250	190	Radiocarbon			{GrA-35558;220}
38			122	1	Radiocart	370	400	340	Radiocarbon			{GrA-40162;370}
39			270	1	Radiocart	1685	1720	1650	Radiocarbon			{GrA-35562;1685}
40			830	1	Radiocart	7640	7680	7600	Radiocarbon			{GrA-35560;7640}

Appendix 4a: Excel worksheet Lithology

In the ASCII data the worksheet "Lithology" will be in the CSV file marked ad "LITH". This a mostly brief description of the lithology of the core as it was observed (see example below). This description is usually made when the core is laid out in the lab.

Most cores have a lithological description, but for some cores this description is missing.

	A	B	C	D	E	F	G	H	I	J	K
1	LITHOLOGY										
2											
3		Top (cm)	Bottom (cm)	Description							
4		0	50	Dark-brown peat, compact, wiht abundant roots and some dark fragments (charcoal?)							
5		50	100	Dark-brown clay with abundant roots.							
6		100	150	Dark-brown organic mud, not very compact at the top and middle. Juncus fragments near the bottom.							
7		150	190	Dark-brown peat, abundant plant fragments.							
8		190	225	Black peat.							
9		225	525	Dark brown peat with abundant roots and plant macrofossil remains. Wood at 425-500 cm.							
10		525	560	Light brown clayey peat.							
11		560	562	Gray sand.							
12		562	700	Brown-reddish peat, compact							
13		700	705	Clayey peat.							
14		705	800	Brown-reddish peat with wood, transitioning to black peat							
15		800	1000	Dark-brown to black peat, abundant plant material.							
16		1000	1050	Black peat transitioning to reddish peat with roots, compact.							
17											

Appendix 4b: Lithology as a CSV file

```

;LITHOLOGY;;
;;;
;Top (cm);Bottom (cm);Description
;0;50;Dark-brown peat, compact, wiht abundant roots and some dark fragments (charcoal?)
;50;100;Dark-brown clay with abundant roots.
;100;150;Dark-brown organic mud, not very compact at the top and middle. Juncus fragments near the bottom.
;150;190;Dark-brown peat, abundant plant fragments.
;190;225;Black peat.
;225;525;Dark brown peat with abundant roots and plant macrofossil remains. Wood at 425-500 cm.
;525;560;Light brown clayey peat.
;560;562;Gray sand.
;562;700;Brown-reddish peat, compact
;700;705;Clayey peat.
;705;800;Brown-reddish peat with wood, transitioning to black peat
;800;1000;Dark-brown to black peat, abundant plant material.
;1000;1050;Black peat transitioning to reddish peat with roots, compact.
;;;

```

The image above shows what the CSV file for the lithology looks like.

Below is what it looks like when you import it into a spreadsheet.

	A	B	C	D	E	F	G	H	I
1		LITHOLOGY							
2									
3		Top (cm)	Bottom (c	Description					
4		0	50	Dark-brown peat, compact, wiht abundant roots and some dark fragments (charcoal?)					
5		50	100	Dark-brown clay with abundant roots.					
6		100	150	Dark-brown organic mud, not very compact at the top and middle. Juncus fragments near the bottom.					
7		150	190	Dark-brown peat, abundant plant fragments.					
8		190	225	Black peat.					
9		225	525	Dark brown peat with abundant roots and plant macrofossil remains. Wood at 425-500 cm.					
10		525	560	Light brown clayey peat.					
11		560	562	Gray sand.					
12		562	700	Brown-reddish peat, compact					
13		700	705	Clayey peat.					
14		705	800	Brown-reddish peat with wood, transitioning to black peat					
15		800	1000	Dark-brown to black peat, abundant plant material.					
16		1000	1050	Black peat transitioning to reddish peat with roots, compact.					
17									