

Ancient flooding traces preserved in a peat bog during these 9000 years presumed by Diatom and Chrysophyceae assemblages at Toushe Peatland, Central Taiwan

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Toushe Peatland is located at a mountain basin, north of Sun Moon Lake, central Taiwan. The thickness of the peat layer exceeded more than 40m, and the peat continuously deposited for 90000 years.

In this paper, we analyzed diatom and Chrysophyceae assemblages at 133 samples of the top 5m sediment of the peat with 2-5 cm intervals, dated until ca 9,000 cal. years BP. The sediment was consisted of homogeneous peat bog, but thin silt-fine sand layers were observed at 56-68cm, 155-160cm, 205-240cm and 470-476cm depth. We measured nine C-14 dating to presume sedimentary ages at the above silt-fine sand layers.

Toushe Peatland is a high peatland, and specific diatom flora (*Eunotia serra*, *E. lunaris* etc.) which prefer acidic water environment are prospered. At the top deposited (0-20 cm depth), *Eunotia serra*, *E. lunaris* were dominated. However, they could hardly be kept in peat sediments. Therefore, diatom fossil was barren in almost part of the peat bog layers.

Diatom assemblages were abundant at thin silt-fine sand layers at 56-68cm, 155-160cm, 205-240cm and 470-476cm depth. The dominated species were *Aulacoseira* spp., *Cymbella* spp., *Pinnularia* spp., and *Staurosira* spp., which were abundant at normal freshwater ponds, rivers, not in an acidic high peatland. They were derived into a peatland from surroundings by outwashes of heavy rain.

Sleeping cists of Chrysophyceae (called Golden Algae) increased at the silt-fine sand layers. They also were derived into a peatland by outwashes.

Thin silt-fine sand layers were deposited by outwash flooding from surrounding ponds and rivers into a peat bog by heavy rainfalls, presumed diatom and Chrysophyceae assemblages.

We found four flooding layers, Flooding I-IV, dated ca.7500 cal yBC (ca.9500 BP), ca. 2500 cal. BC (ca.4500 BP), ca. 1800 cal. BC (ca.3800 BP) and ca.600-750 cal. AD (ca.1350-1200 BP), respectively. Recent acidic pond was performed after ca.1400 cal. AD (ca.550 BP).

Ancient flood traces in Toushe peat bog could be compared the flooding traces at Korean Peninsula and Kyushu-Okinawa Islands. They might be caused by global climatic events in East Asia.

Keywords: Peat, The Holocene, Climatic Change, Flooding sediments, Taiwan

Table 1 Diatom Assemblages and Flooding layers in Tousse Peatland
珪藻群集から推定された頭社泥炭地における洪水堆積層とその福年

	Lithofaces	Depth	Diatom valves (1mg)	Dominated Diatom Species	C14 ages Non calibrated (Calibrated±2σ)
Recent (After 1400 AD)	Surface Soil	2-20	345-19500	<i>Eunoto serra</i> , <i>E. lunaris</i>	Non calibrated (Calibrated±2σ)
Flooding IV (600-750 cal AD)	Peat Bog	20-56	0-80	None Only fragments	500±20(25cm) (AD1308-1405)
	Silt-Fine Sand	56-68	735-27720	<i>Cymbella</i> spp., <i>Eunoto</i> spp., <i>Frustulia</i> spp., <i>Pinnularia</i> spp.	1365±20(56cm) (AD643-755) 1540±20(68cm) (AD437-595)
Flooding III (1800 cal BC)	Peat Bog	68-155	0	none	
	Silt-Fine Sand	155-160	200-4290	<i>Eunoto</i> spp., <i>Frustulia</i> spp., <i>Mavculia</i> spp., <i>Pinnularia</i> spp.	3495±20(160cm) (BC1885-1747)
Flooding II (2500 cal BC)	Peat Bog	160-202	0-40	None Only fragments	3825±20(200cm) (BC2471-2304)
	Silt-Fine Sand	202-240	120-64600	<i>Autocostera</i> spp., <i>Cymbella</i> spp., <i>Pinnularia</i> spp., <i>Sauronora</i> spp.	4900±20(220cm) (BC2579-2469)
Flooding I (7500 cal BC)	Peat Bog	240-470	0-10	None Only fragments	6590±25(300cm) (BC5614-5480) 7945±25(395cm) (BC7035-6694)
	Silt-Fine Sand	470-476	192-1245	<i>Mavculia</i> spp., <i>Pinnularia</i> spp.	8375±30(465cm) (BC7558-7349)
	Peat Bog	478-500	0-36	None Only fragments	

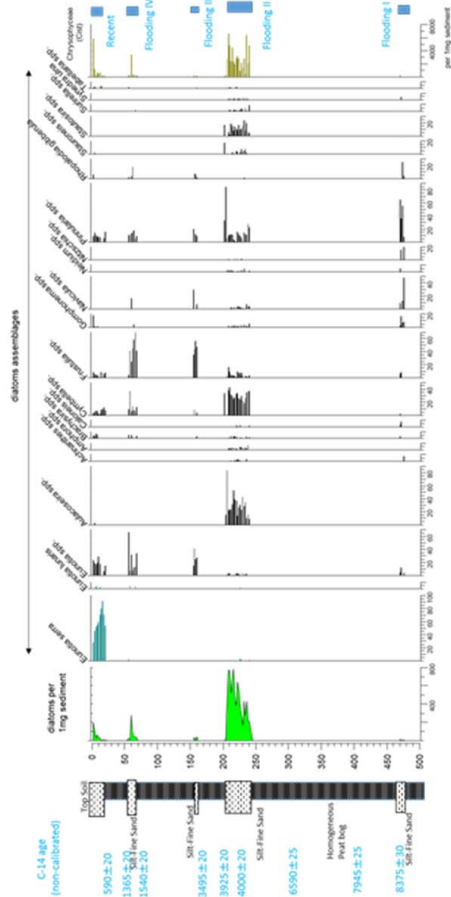
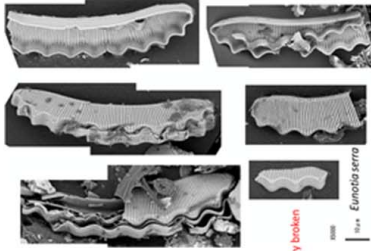


Fig.1 Diatom and Chrysophyceae Assemblages in Tousse Peatland
頭社泥炭地から推定された珪藻および黄金色藻化石群集



Fig.2 Flooding layers among the peat bog
泥炭層中に挟在する洪水堆積層

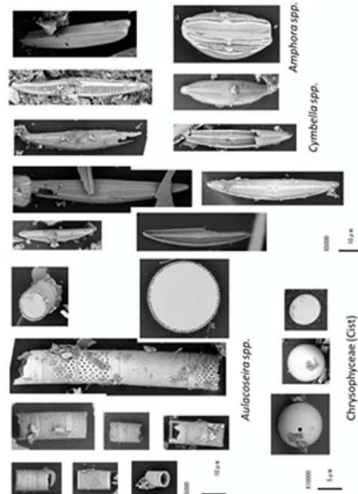


Diatom assemblages

- Specific Species at a high peatland
- They could not be preserved in peat bogs as fossils. Therefore, diatoms were barren at peat bog deposits

強酸性環境に適応して生息する珪藻群集
泥炭層内で保存されにくい
They were usually heavily broken

Fig.3 Diatom assemblages at Acidic Peat Bog
強酸性泥炭層から産出する珪藻群集



Diatoms, living surrounding ponds and rivers.
They were derived into a peatland by flooding.
Please check the diatom catalog of Tousse Peatland (attached file)

Fig.4 Diatom and Chrysophyceae assemblages at the Flooding Layers

洪水堆積層から産出する珪藻および黄金色藻群集

Table 2 List of C-14 dating at Tousse Peat Land
頭社泥炭地から測定されたC-14年代測定値 (パレオラボ社)

試料番号	δ13C (‰)	14C年代 (BP)	14C年代 (cal AD)	14C年代 (cal BC)
FD-4009 Tissue-29	-21.22 0.14	891±219	1309±202 (cal AD)	1309±202 (cal AD)
FD-4009 Tissue-29	-21.22 0.14	1301±219	1309±202 (cal AD)	1309±202 (cal AD)
FD-4010 Tissue-29	-21.22 0.14	1301±219	1309±202 (cal AD)	1309±202 (cal AD)
FD-4011 Tissue-29	-21.22 0.14	1301±219	1309±202 (cal AD)	1309±202 (cal AD)
FD-4012 Tissue-29	-21.22 0.14	1301±219	1309±202 (cal AD)	1309±202 (cal AD)
FD-4013 Tissue-29	-21.22 0.14	1301±219	1309±202 (cal AD)	1309±202 (cal AD)
FD-4014 Tissue-29	-21.22 0.14	1301±219	1309±202 (cal AD)	1309±202 (cal AD)
FD-4015 Tissue-29	-21.22 0.14	1301±219	1309±202 (cal AD)	1309±202 (cal AD)
FD-4016 Tissue-29	-21.22 0.14	1301±219	1309±202 (cal AD)	1309±202 (cal AD)
FD-4017 Tissue-29	-21.22 0.14	1301±219	1309±202 (cal AD)	1309±202 (cal AD)
FD-4018 Tissue-29	-21.22 0.14	1301±219	1309±202 (cal AD)	1309±202 (cal AD)
FD-4019 Tissue-29	-21.22 0.14	1301±219	1309±202 (cal AD)	1309±202 (cal AD)
FD-4020 Tissue-29	-21.22 0.14	1301±219	1309±202 (cal AD)	1309±202 (cal AD)
FD-4021 Tissue-29	-21.22 0.14	1301±219	1309±202 (cal AD)	1309±202 (cal AD)
FD-4022 Tissue-29	-21.22 0.14	1301±219	1309±202 (cal AD)	1309±202 (cal AD)
FD-4023 Tissue-29	-21.22 0.14	1301±219	1309±202 (cal AD)	1309±202 (cal AD)
FD-4024 Tissue-29	-21.22 0.14	1301±219	1309±202 (cal AD)	1309±202 (cal AD)
FD-4025 Tissue-29	-21.22 0.14	1301±219	1309±202 (cal AD)	1309±202 (cal AD)
FD-4026 Tissue-29	-21.22 0.14	1301±219	1309±202 (cal AD)	1309±202 (cal AD)
FD-4027 Tissue-29	-21.22 0.14	1301±219	1309±202 (cal AD)	1309±202 (cal AD)
FD-4028 Tissue-29	-21.22 0.14	1301±219	1309±202 (cal AD)	1309±202 (cal AD)
FD-4029 Tissue-29	-21.22 0.14	1301±219	1309±202 (cal AD)	1309±202 (cal AD)
FD-4030 Tissue-29	-21.22 0.14	1301±219	1309±202 (cal AD)	1309±202 (cal AD)
FD-4031 Tissue-29	-21.22 0.14	1301±219	1309±202 (cal AD)	1309±202 (cal AD)
FD-4032 Tissue-29	-21.22 0.14	1301±219	1309±202 (cal AD)	1309±202 (cal AD)
FD-4033 Tissue-29	-21.22 0.14	1301±219	1309±202 (cal AD)	1309±202 (cal AD)
FD-4034 Tissue-29	-21.22 0.14	1301±219	1309±202 (cal AD)	1309±202 (cal AD)
FD-4035 Tissue-29	-21.22 0.14	1301±219	1309±202 (cal AD)	1309±202 (cal AD)
FD-4036 Tissue-29	-21.22 0.14	1301±219	1309±202 (cal AD)	1309±202 (cal AD)
FD-4037 Tissue-29	-21.22 0.14	1301±219	1309±202 (cal AD)	1309±202 (cal AD)
FD-4038 Tissue-29	-21.22 0.14	1301±219	1309±202 (cal AD)	1309±202 (cal AD)
FD-4039 Tissue-29	-21.22 0.14	1301±219	1309±202 (cal AD)	1309±202 (cal AD)
FD-4040 Tissue-29	-21.22 0.14	1301±219	1309±202 (cal AD)	1309±202 (cal AD)
FD-4041 Tissue-29	-21.22 0.14	1301±219	1309±202 (cal AD)	1309±202 (cal AD)
FD-4042 Tissue-29	-21.22 0.14	1301±219	1309±202 (cal AD)	1309±202 (cal AD)
FD-4043 Tissue-29	-21.22 0.14	1301±219	1309±202 (cal AD)	1309±202 (cal AD)
FD-4044 Tissue-29	-21.22 0.14	1301±219	1309±202 (cal AD)	1309±202 (cal AD)
FD-4045 Tissue-29	-21.22 0.14	1301±219	1309±202 (cal AD)	1309±202 (cal AD)
FD-4046 Tissue-29	-21.22 0.14	1301±219	1309±202 (cal AD)	1309±202 (cal AD)
FD-4047 Tissue-29	-21.22 0.14	1301±219	1309±202 (cal AD)	1309±202 (cal AD)
FD-4048 Tissue-29	-21.22 0.14	1301±219	1309±202 (cal AD)	1309±202 (cal AD)
FD-4049 Tissue-29	-21.22 0.14	1301±219	1309±202 (cal AD)	1309±202 (cal AD)
FD-4050 Tissue-29	-21.22 0.14	1301±219	1309±202 (cal AD)	1309±202 (cal AD)