Supplementary Table S1

Detailed pollen preparation procedures for samples treated with hydrofluoric acid (HF) and fine sieving (TS I–Va) and dense media separation and differential centrifugation (TS I–Vb and c). For stirring the sample/chemical and sample/water mixtures, we used, unless otherwise stated, polypropylene stirring rods. For centrifugation, we used a Sigma 3-16L lab centrifuge. The chosen forces are given in relative centrifugal force (RCF).

Protocol for samples TS I–Va (Standard)	**Protocol for samples TS I–Vb and c**
1. Addition of one *Lycopodium clavatum* marker spore tablet (batch no. 483216, Department of Geology, Lund University) to each sample placed in a 50 ml polypropylene (PP) centrifuge tube to estimate the pollen concentration per sample (Stockmarr, 1971); due to the high pollen concentration, two tablets were added to the TS IV sub-samples	
2. Addition of ca. 20 ml hydrochloric acid (HCl, 10%) to remove carbonates; after reaction, samples were washed 2x with deionised water and centrifuged at RCF 3000 for 3 min using 50 ml PP centrifuge tubes	
3. Addition of ca. 20 ml potassium hydroxide (KOH, 10%) to remove humic acids; reaction was accelerated by placing the centrifuge tubes into a hot water bath (ca. 90°C) for 15 min; samples were washed with deionised water until supernatant was nearly clear; centrifugation at RCF 3000 for 3 min using 50 ml PP centrifuge tubes	
4a. Addition of ca. 30 ml cold hydrofluoric acid (HF, 40%) to remove siliceous matter; samples were left at room temperature overnight in 50 ml PP centrifuge tubes	4b. Differential centrifugation to remove clays; sample suspension and centrifugation was repeated until supernatant was clear (up to 20 times); centrifugation at RCF 950 for 3 min using 50 ml PP centrifuge tubes; mixing of samples was done using a vortex shaker
5a. Washing samples 1x with hydrochloric acid (HCl, 10%) to remove silicofluorides and 3x with deionised water; centrifugation at RCF 3000 for 3 min using 50 ml PP centrifuge tubes	5b. Addition of ca. 5–7 ml LST (sub-samples TS I–Vb) and SPT (sub-samples TS I–Vc) at 2.1 g/cm^3 to the samples placed in 15 ml PP centrifuge tubes for dense media separation to remove siliceous matter and other components of >2.1 g/cm^3; samples were mixed vigorously using a vortex shaker; centrifugation at RCF 650 for 20 min; the supernatants were transferred into new centrifuge tubes and filled up with deionised water to decrease the density to <1.2 g/cm^3, shaked by hand and centrifuged at RCF 3000 for 3 min; washing with deionised water was repeated 2x; washing supernatants were collected for recycling.
6. Washing the samples with ca. 5–7 ml glacial acetic acid (CH_3COOH) to dehydrate the sample for acetolysis; centrifugation at RCF 3000 for 3 min using 15 ml PP centrifuge tubes	
7. Addition of 3–5 ml of a mixture of acetic anhydride ($(CH_3CO)_2O$) and concentrated sulphuric acid (H_2SO_4 95–97%) at a mixing ratio of 9/1 for acetolysis to remove cellulose and other organic components; reaction was accelerated by placing the 15 ml PP centrifuge tubes into a hot water bath (ca. 90°C) for 2 min	
8. Filling up the 15 ml PP centrifuge tubes with glacial acetic acid (CH_3COOH) and stirring of sample to stop the acetolysis; washing 2x with deionised water; centrifugation at RCF 3000 for 3 min	
9a. Fine sieving of samples using a mesh size of 7 µm and an ultrasonic water bath to remove clays; maximum sieve time <3 min; centrifugation at RCF 3000 for 3 min	9b. Transfer of samples to 5 ml PP tubes, centrifugation at RCF 3000 for 3 min for decantation of remaining water and addition of 5–10 drops of glycerol ($C_3H_5(OH)_3$) for sample storage and microscopic analysis
10. Transfer of samples to 5 ml PP tubes, centrifugation at RCF 3000 for 3 min for decantation of remaining water and addition of 5–10 drops of glycerol ($C_3H_5(OH)_3$) for sample storage and microscopic analysis	n/a