Fig. 3.1. PEMD deployed in the intertidal zone.

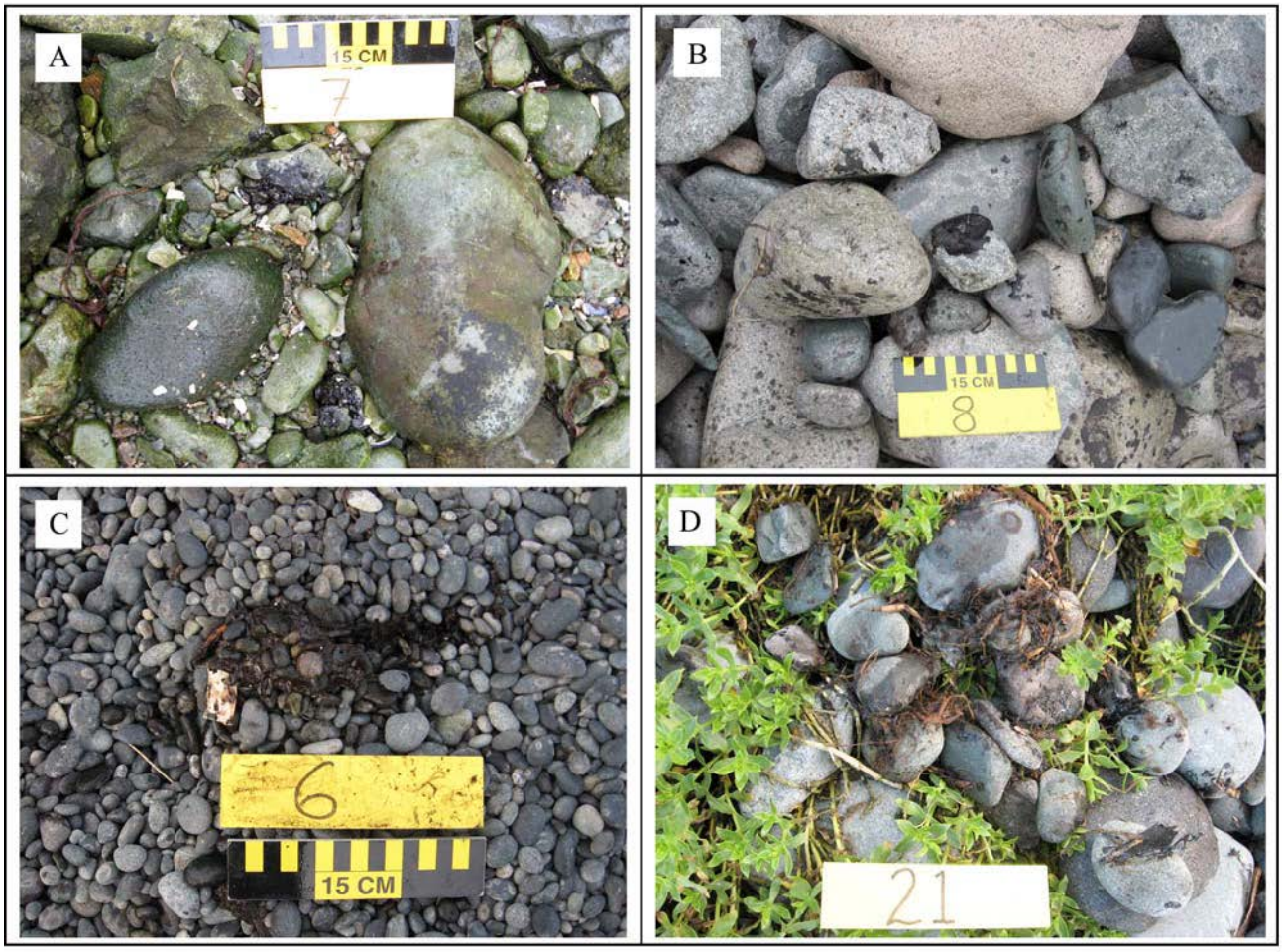

Fig. 3.2. Photographs of the different types of subsurface oil observed in 2008 on the oiled zones. A) Moderately oiled residue from 0-5 cm at HMP-05B; B) Coat/cover on individual clasts from 0-10 cm at KFP-01E; C) Tarball from 55-60 cm at SKN-05A; and D) Coat/cover/pooled oil from 15-40 cm at MKS-16B. The number indicates the pit number.

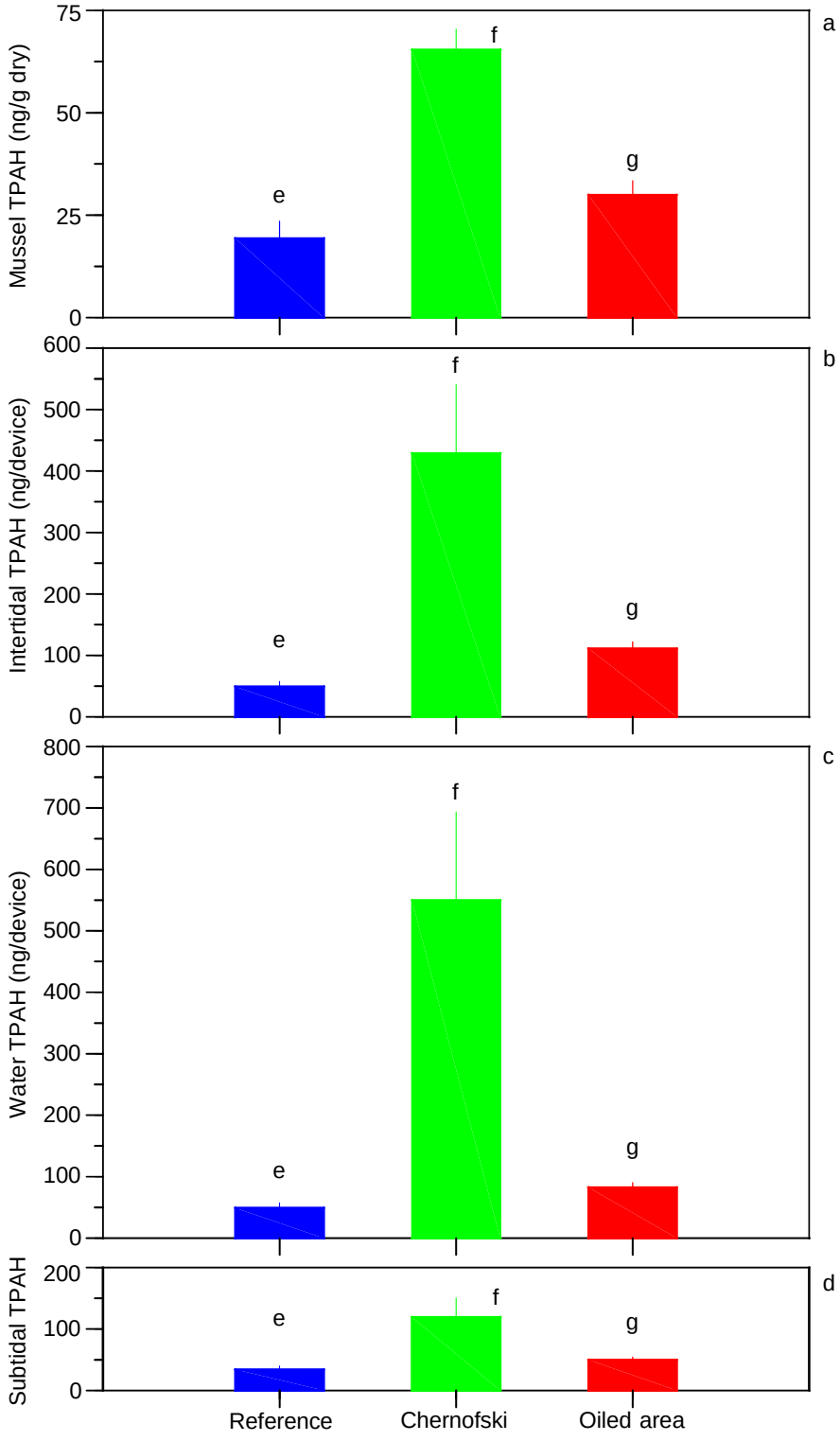

Fig. 3.3. Geometric mean PAH concentrations in mussels (panel a) and PEMDs (panels b – d) by area [reference, historical impact (Chernofski Harbor), and oiled] and zone (subtidal, surface water, and intertidal). Error bars are ± SE. Within each zone, all estimates were significantly different, signified by different letters.

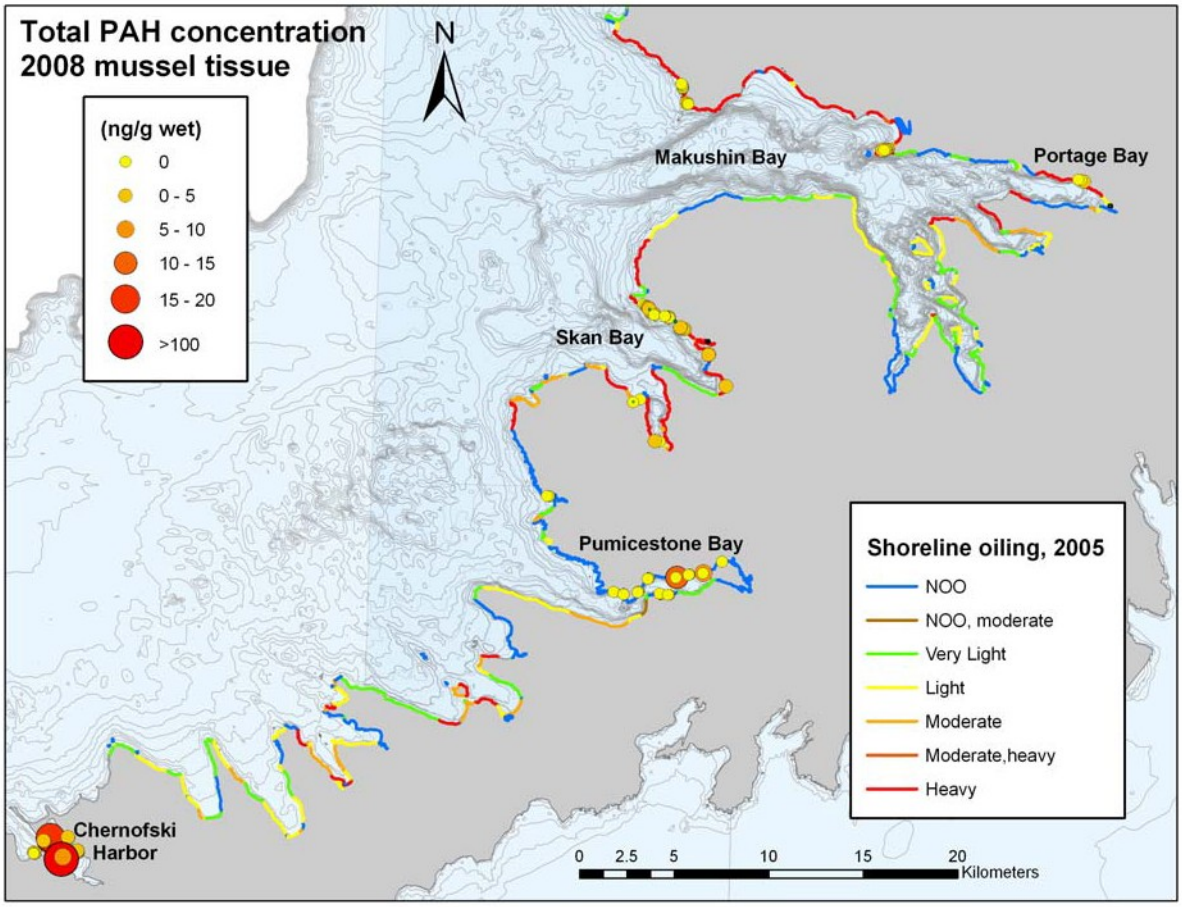

Fig. 3.4. Total PAH distribution in mussel tissue (2008) within the previous *Selendang Ayu* spill area, historically contaminated, and reference areas. Shoreline oiling was assessed in 2005.

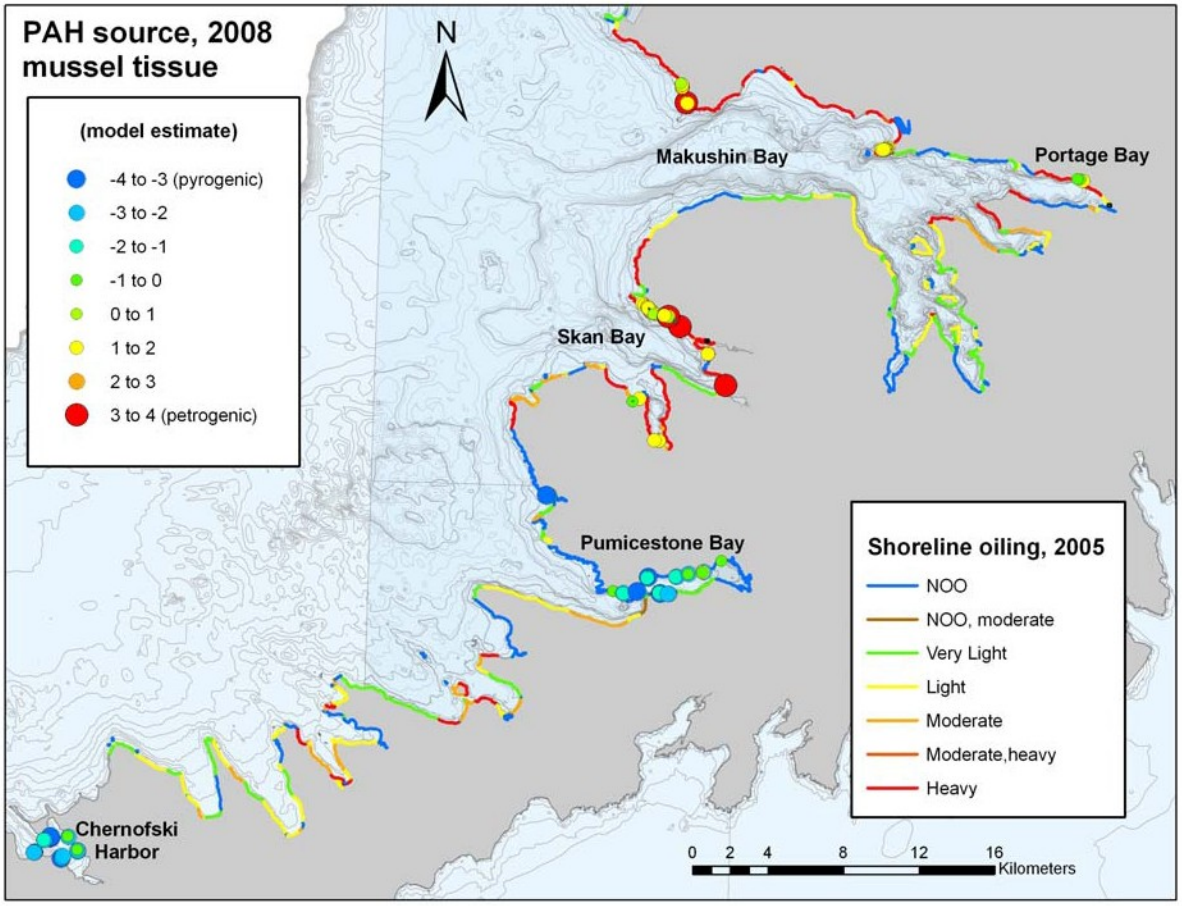

Fig. 3.5. Source distribution of PAHs in mussel tissue (2008) within the previous *Selendang Ayu* spill area, historically contaminated, and reference areas. Shoreline oiling was assessed in 2005.

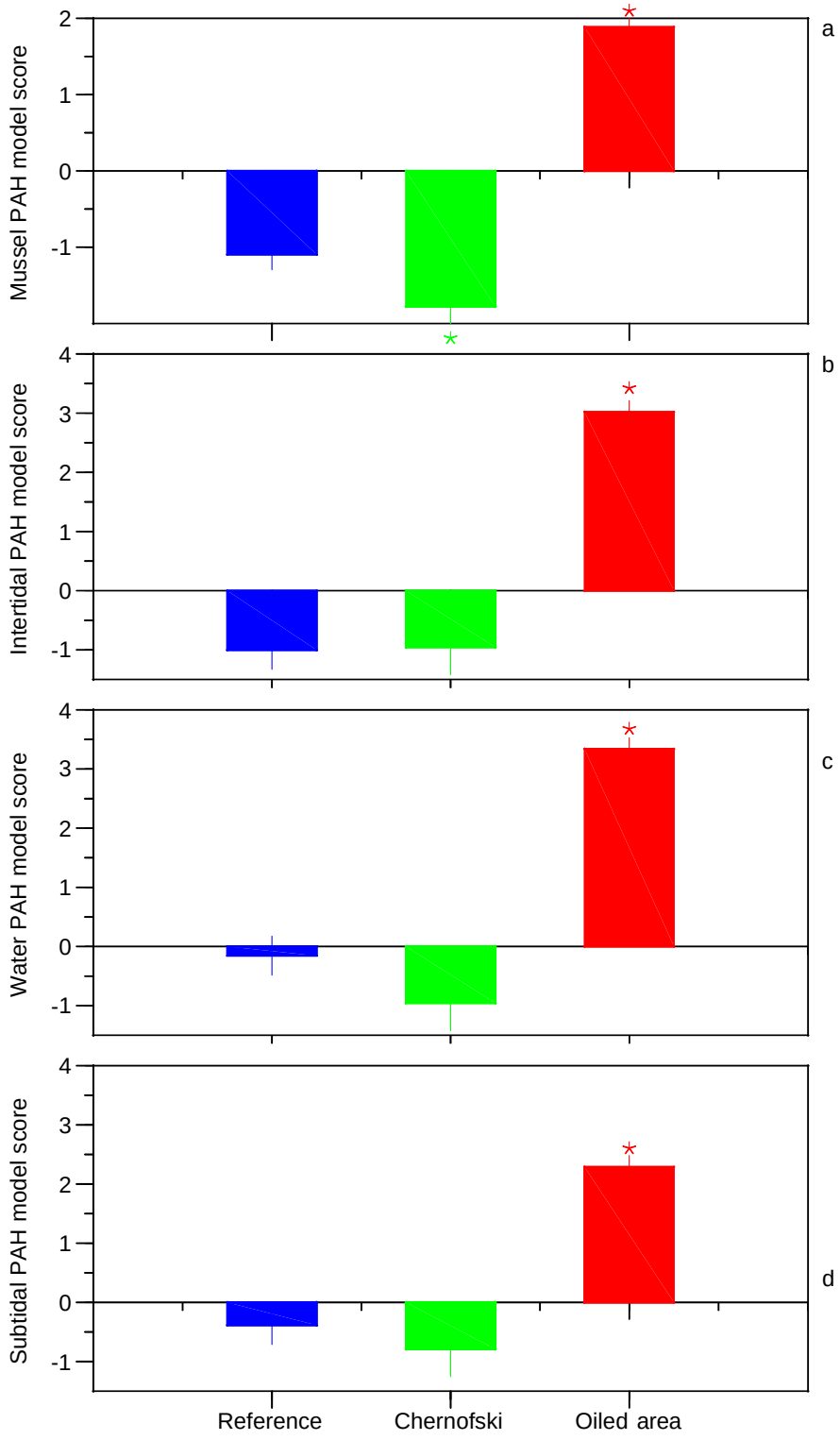

Fig. 3.6. Mean PAH source model scores in mussels (panel a) and PEMDs (panels b – d) by area [reference, historical impact (Chernofski Harbor), and oiled] and zone (subtidal, surface water, and intertidal). Potential model scores range from -6 (pyrogenic) to +6 (petrogenic); scores close to 0 indicate ambiguous sources. Error bars are ±SE. Asterisks indicate significant differences within each zone.

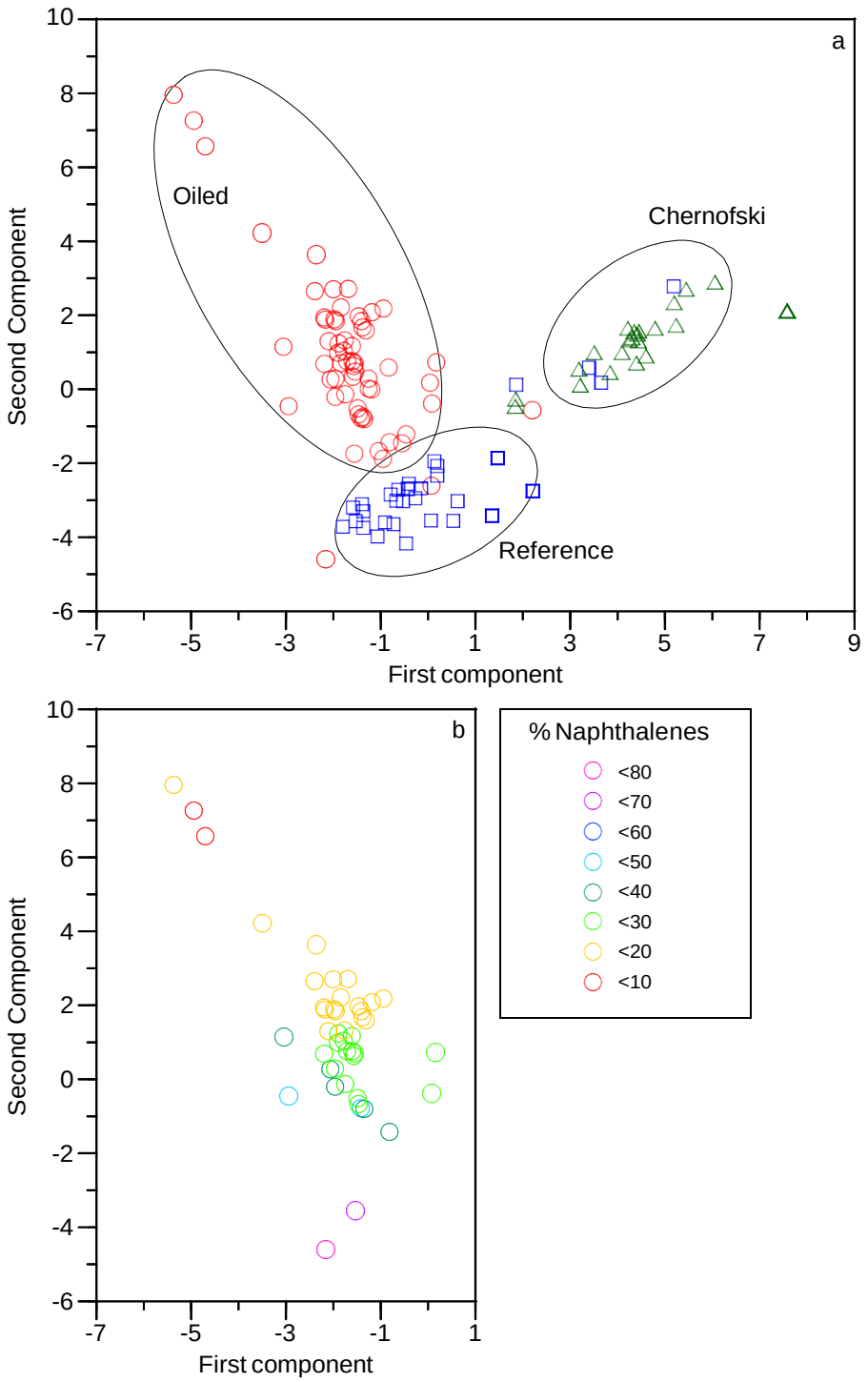

Fig. 3.7. First and second principal components from correlation matrix of normalized PAHs in mussel tissue. Panel a includes data from all sources: oiled sites are illustrated with circles, reference with squares, Chernofski Harbor with triangles. Panel b repeats oiled samples only (identified by oil source model scores ≥2), color coded by percent naphthalenes as a surrogate for weathering.

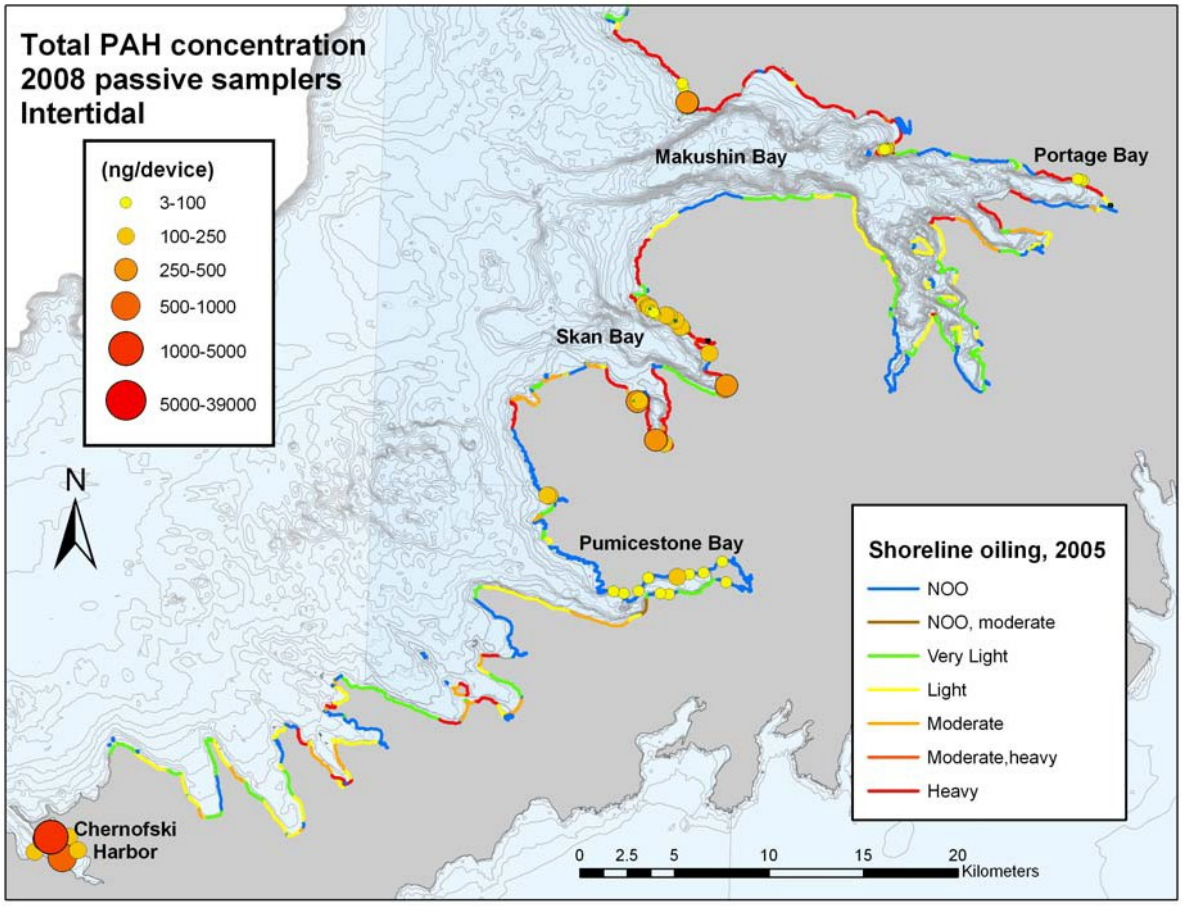

Fig. 3.8. Total PAH distribution in passive samplers (2008) within the previous *Selendang Ayu* spill area, historically contaminated (Chernofski Harbor), and reference areas by zone (subtidal, surface water, and intertidal). Shoreline oiling was assessed in 2005.

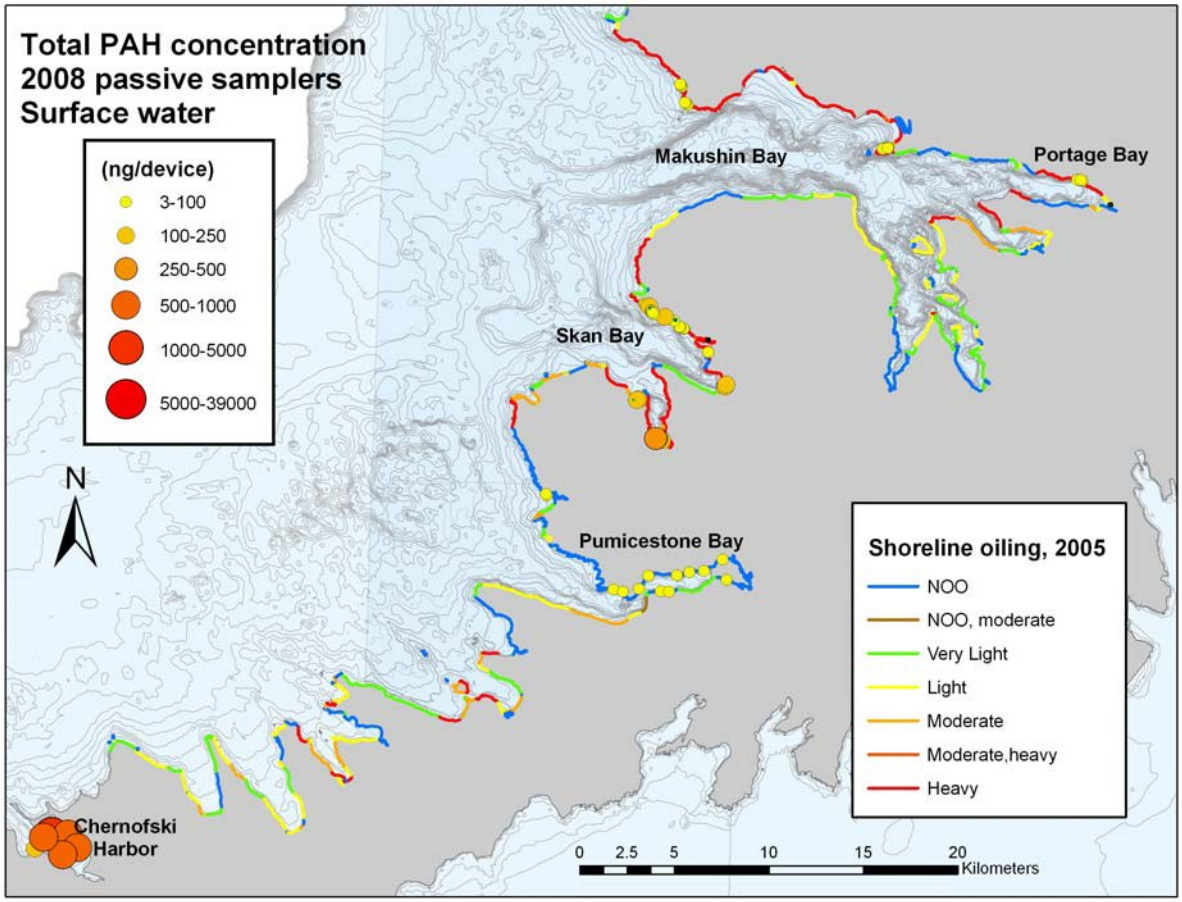

Fig. 3.8, continued

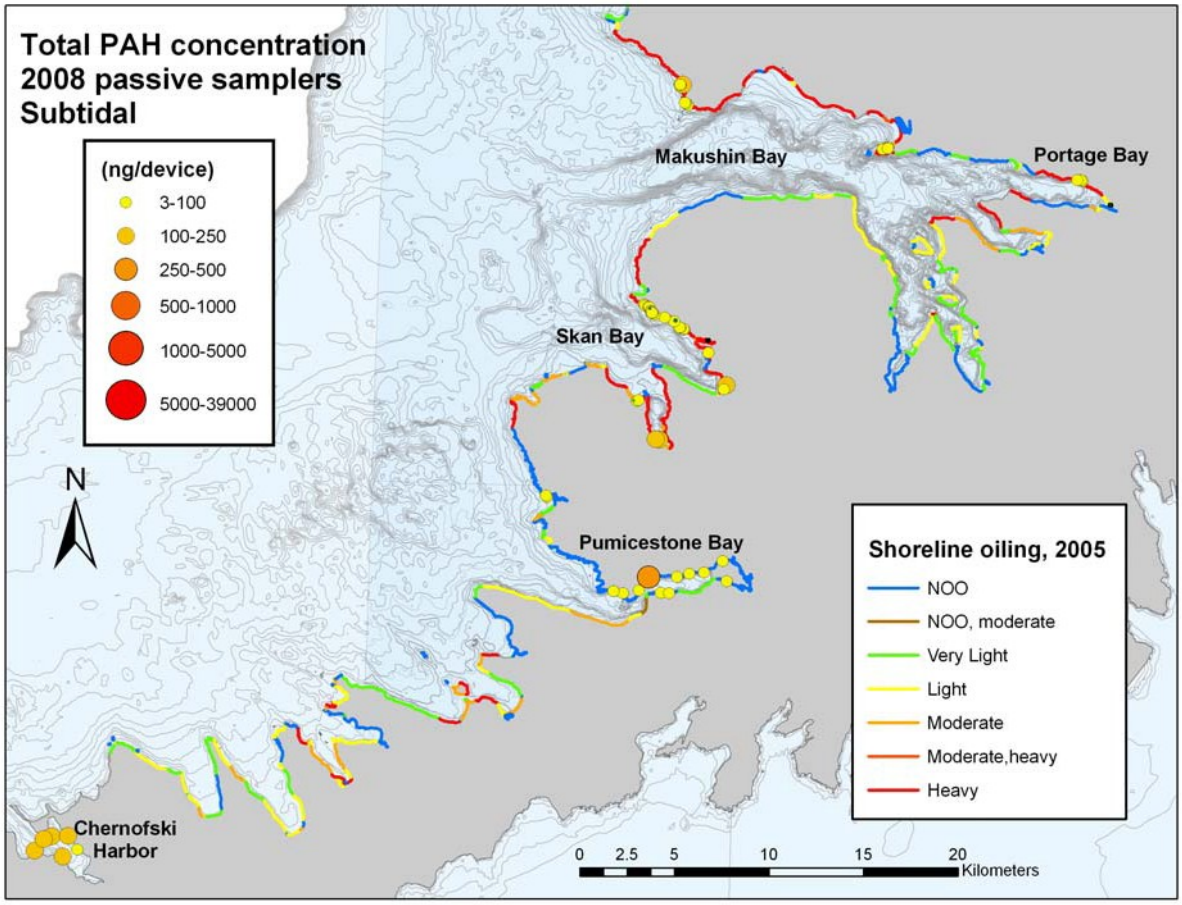

Fig.3. 8, continued

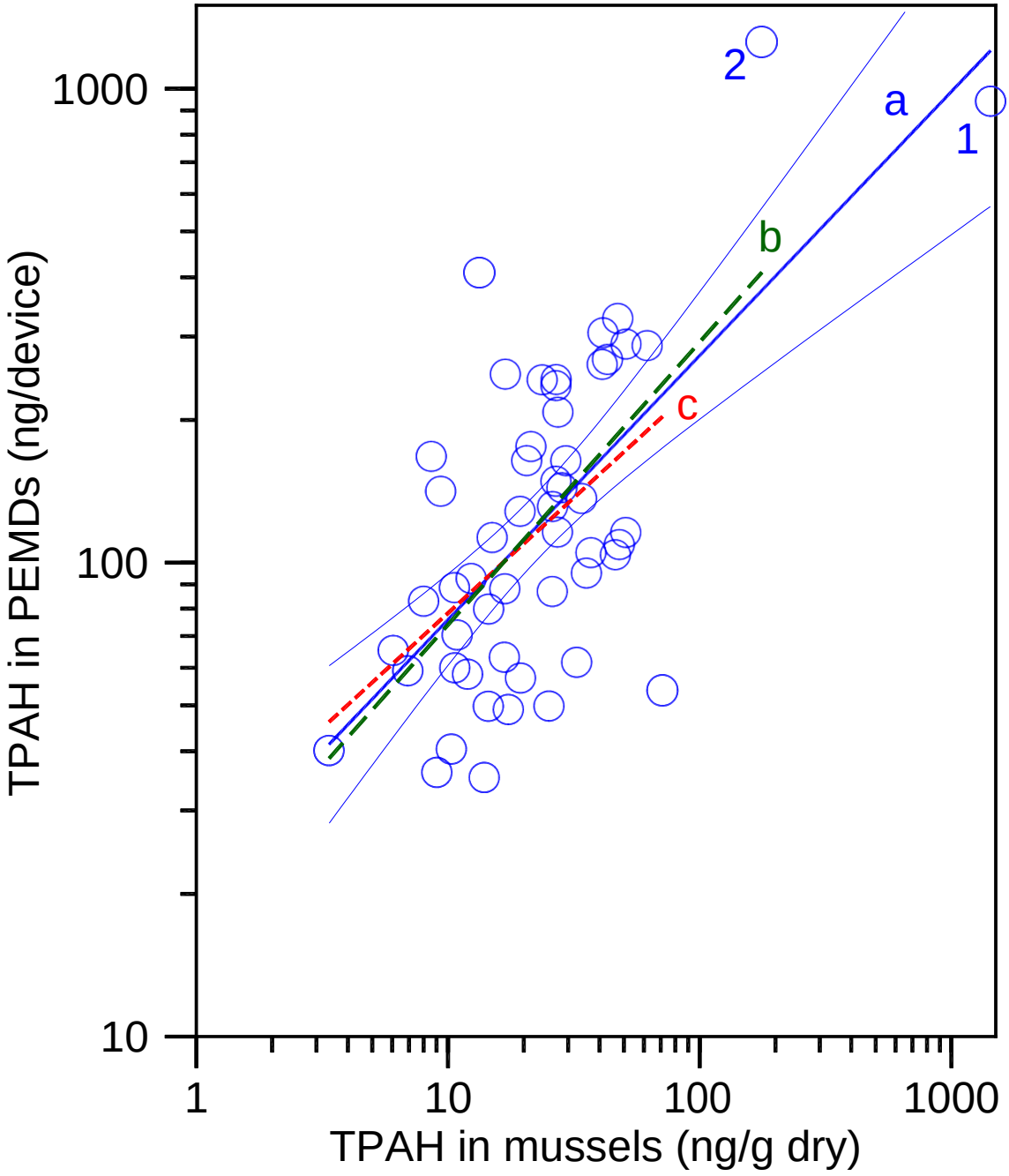

Fig. 3.9. Total PAH in passive samplers (PEMDs) versus that in mussels. Regression "a" includes all data points and indicates 95% confidence bands. Regression "b" excludes leverage point 1 and regression "c" excludes both leverage points.

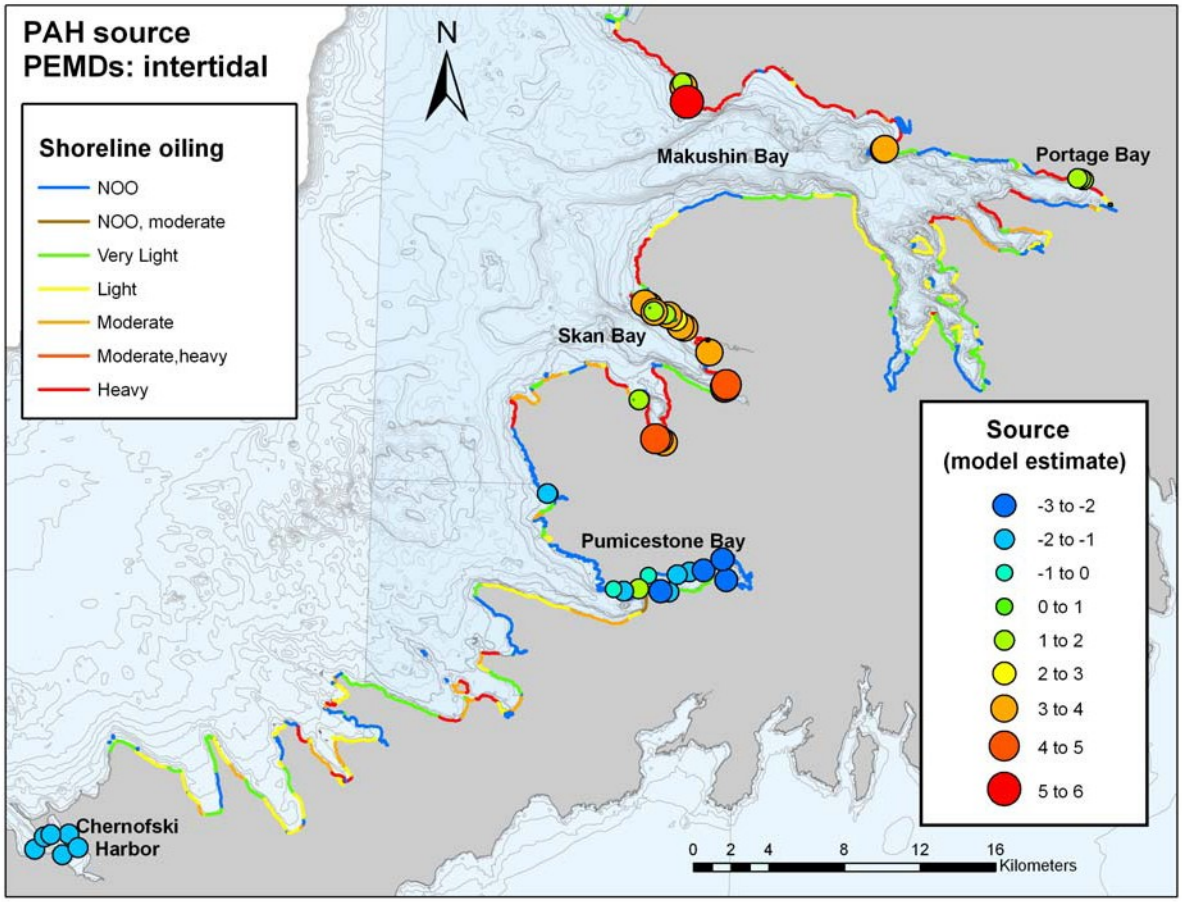

Fig. 3.10. Source distribution of PAHs in passive samplers (2008) within the previous *Selendang Ayu* spill area, historically contaminated (Chernofski Harbor), and reference areas by zone (subtidal, surface water, and intertidal). Shoreline oiling was assessed in 2005.

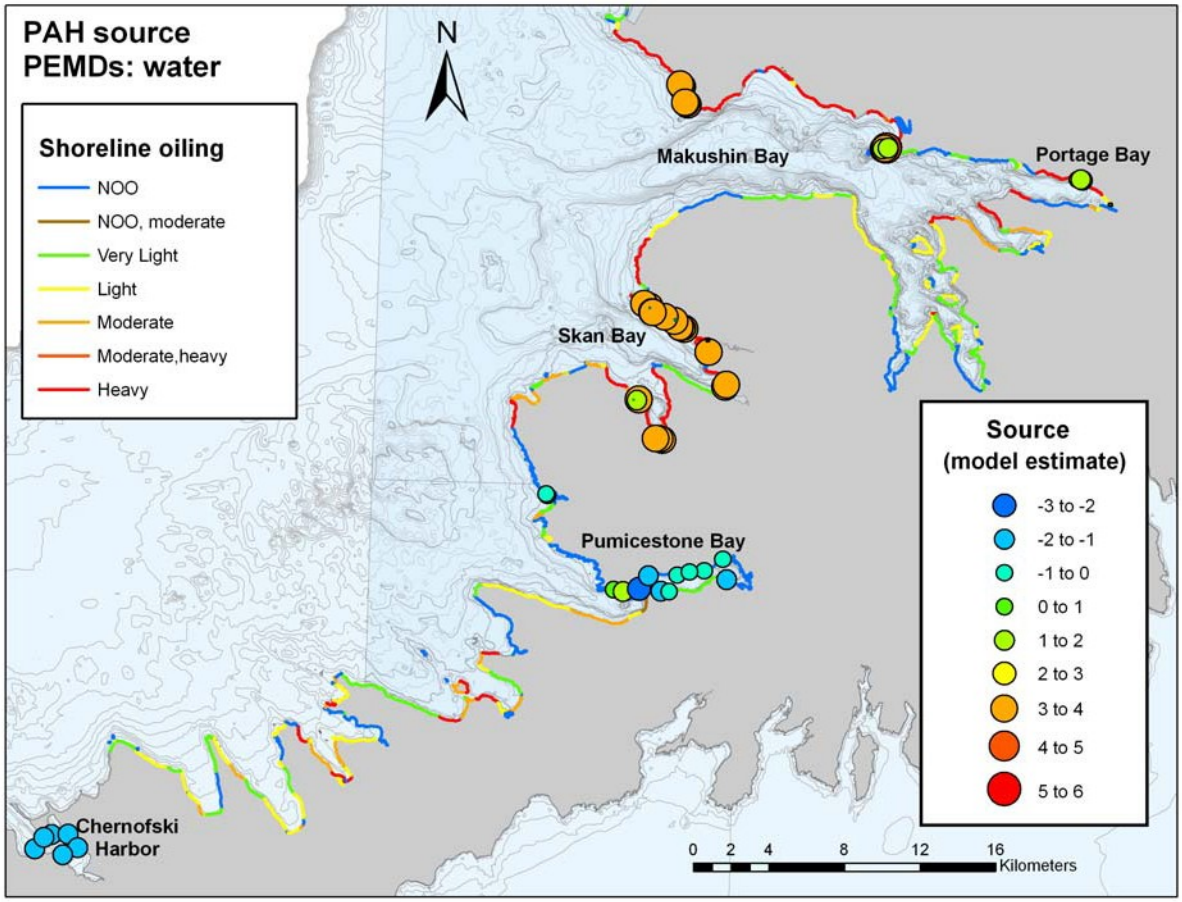

Fig. 3.10, continued

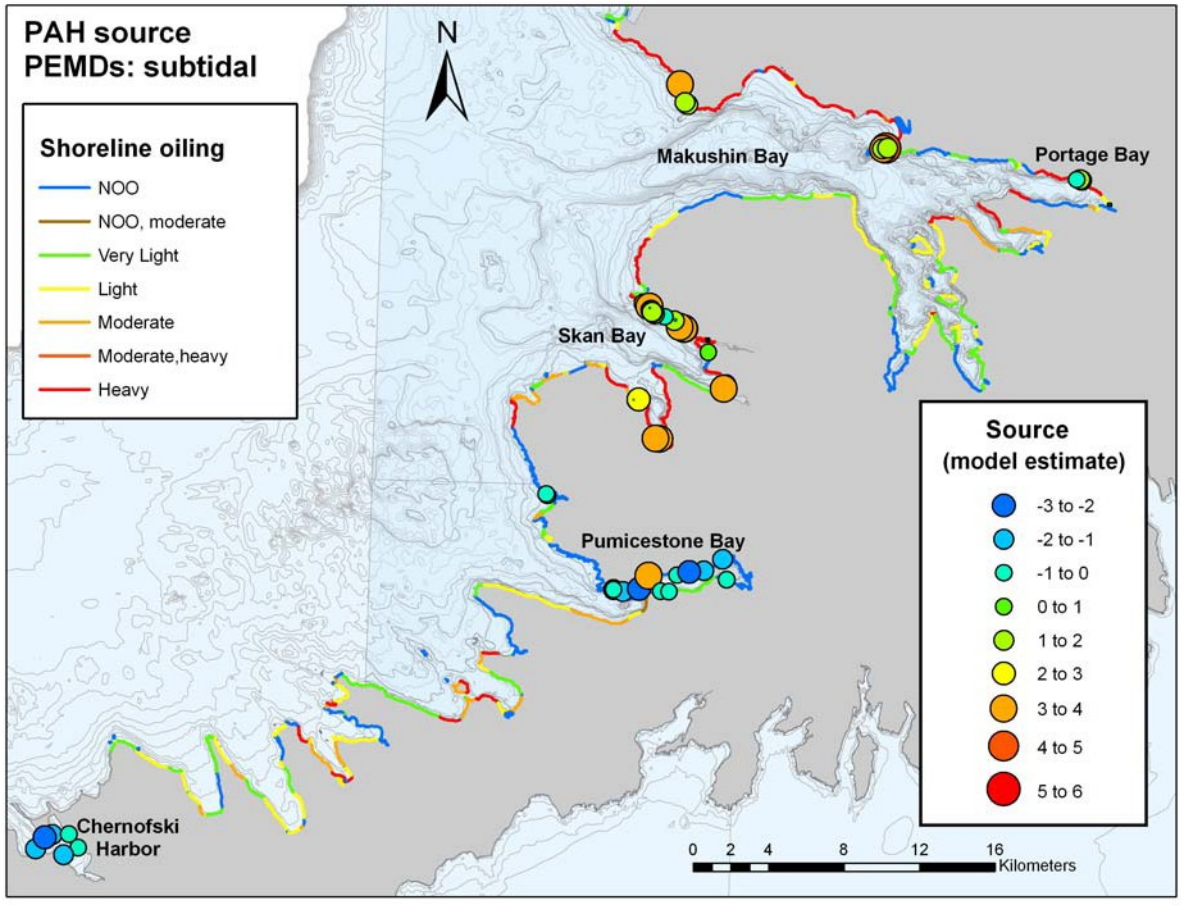

Fig. 3.10, continued

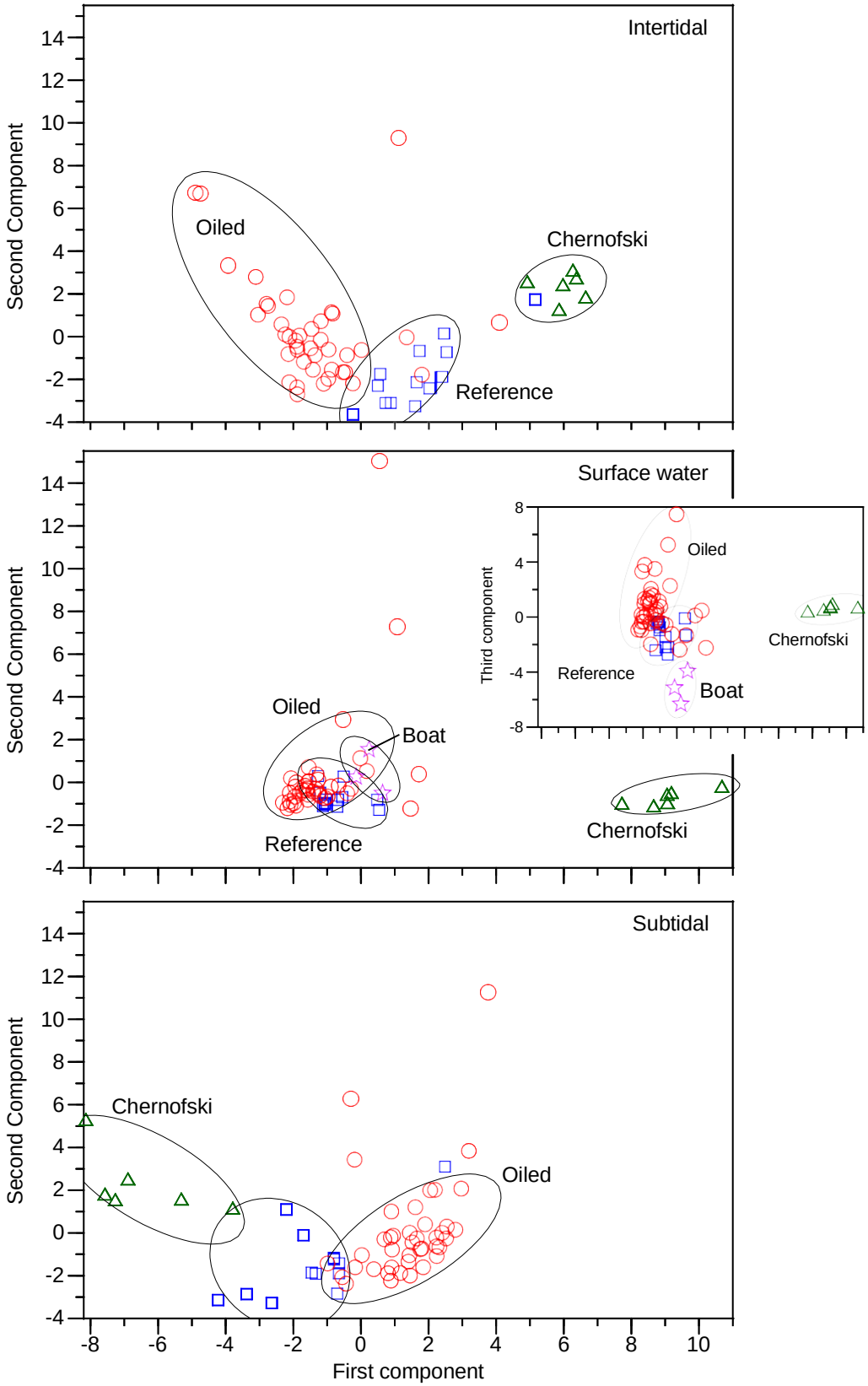

Fig. 3.11. First and second principal components from correlation matrix of normalized PAHs in passive samplers (PEMDs) by zone (intertidal, surface water, and subtidal).

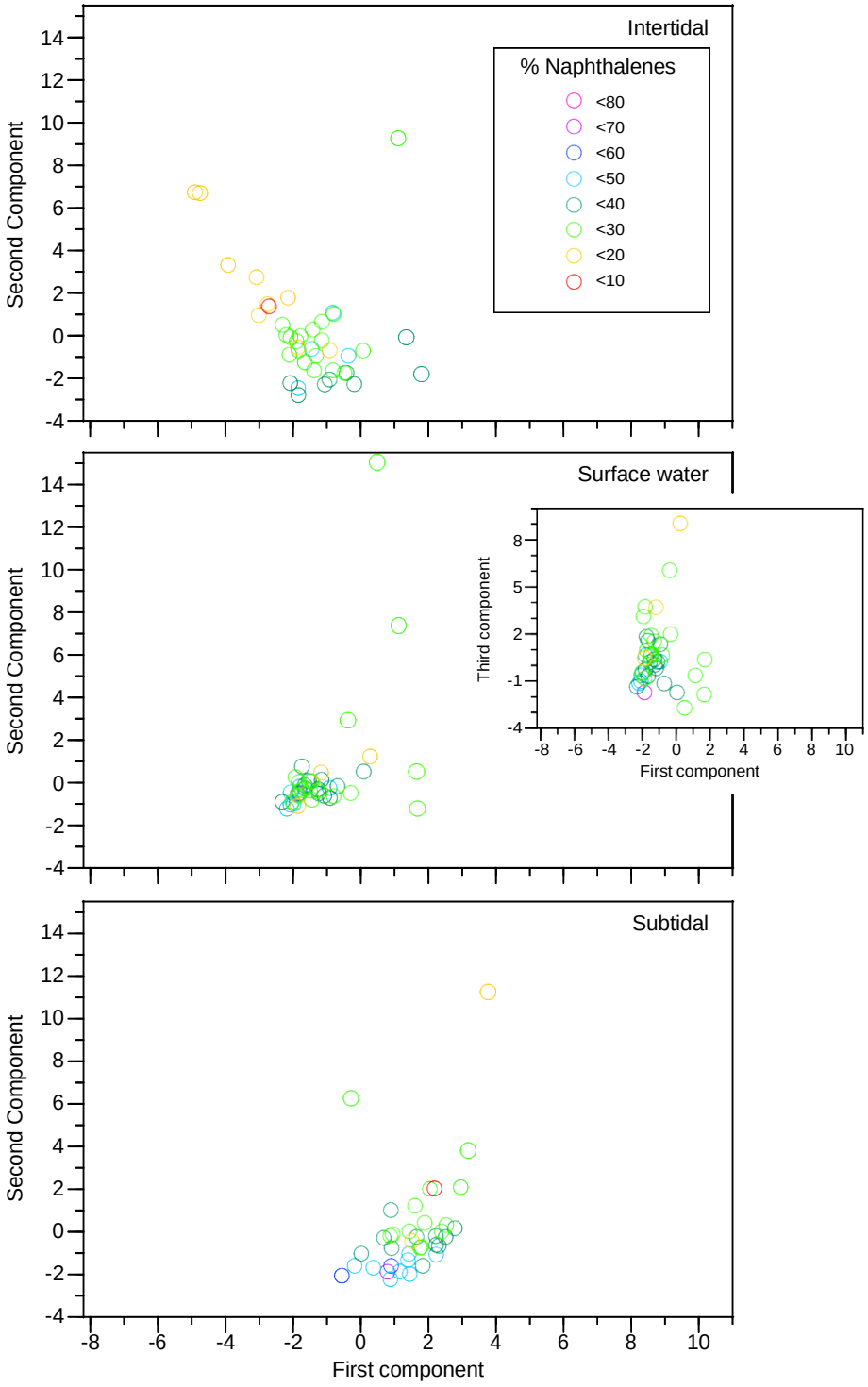

Fig. 3.11b. First and second principal components from correlation matrix of normalized PAHs in passive samplers (PEMDs) by zone (intertidal, surface water, and subtidal) for oiled samples only (where score ≥2), color coded by percent naphthalenes as a surrogate for weathering.

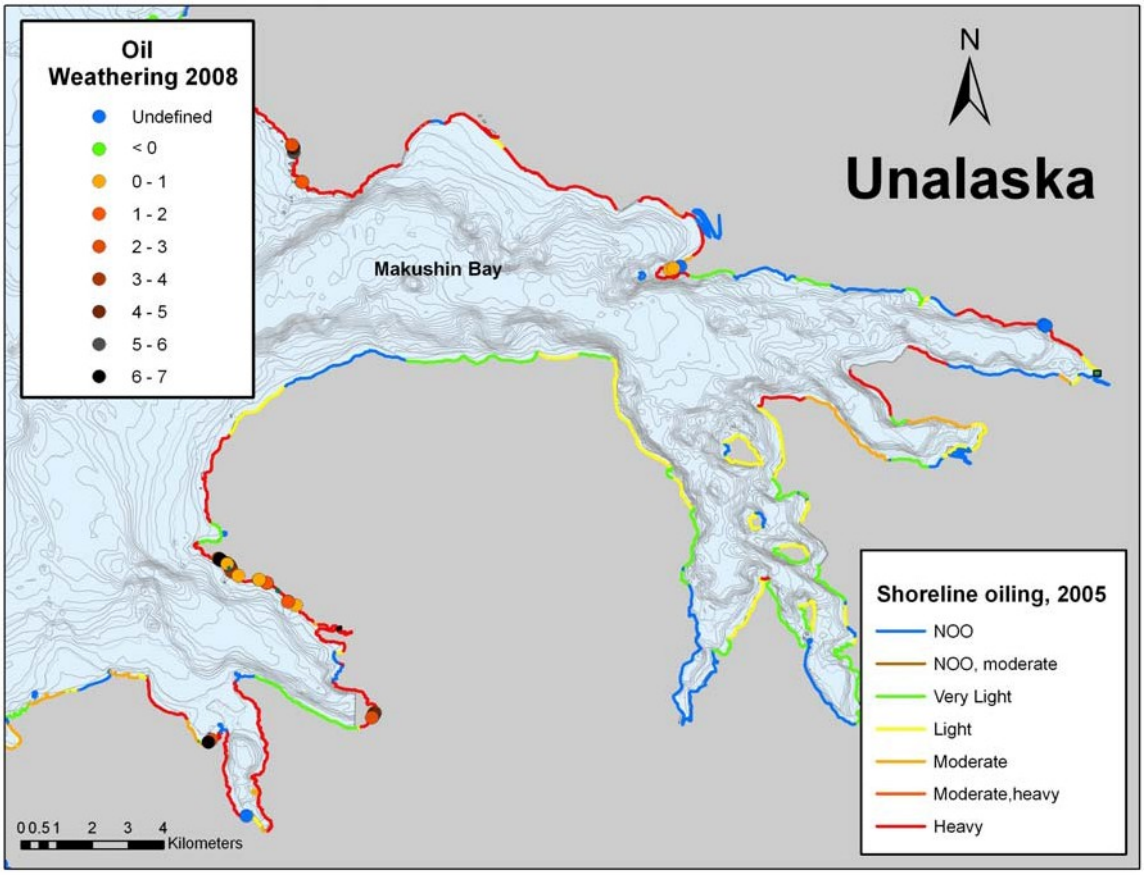

Fig. 3.12. Source distribution of PAHs in sediment (2008) within the previous *Selendang Ayu* spill area. Sediments were not collected from the reference area and Chernofski harbor. Shoreline oiling was assessed in 2005.

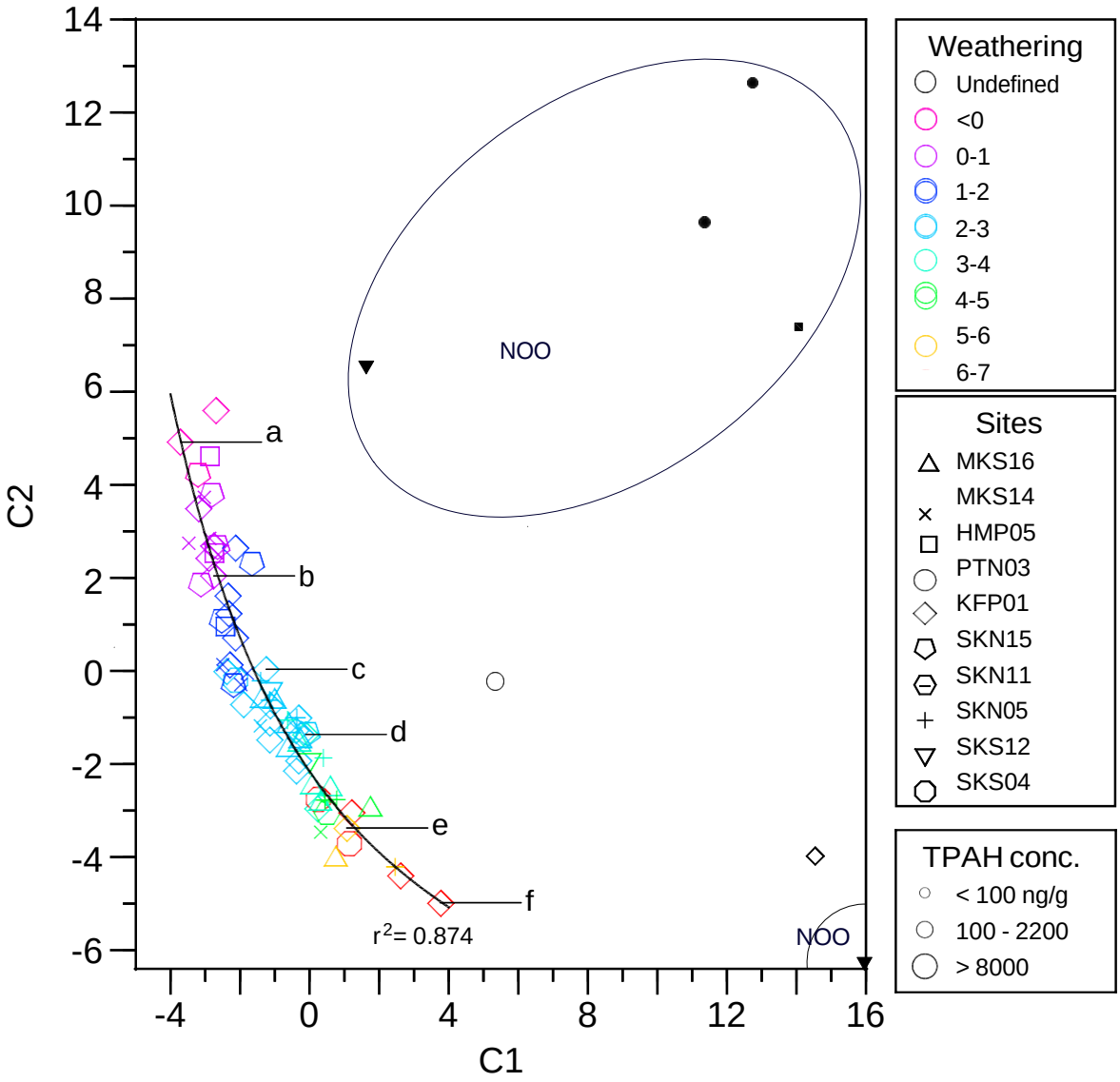

Fig. 3.13. Summary of PAHs in oil or oiled sediment, 2008. First and second principal components from the correlation matrix of normalized PAHs in sediment in 2008 color-coded by weathering coefficient (*w*). Filled symbols indicate samples where PAH composition modeling did not identify oil (score < 4); no oil was observed (NOO) in any of these samples at the time of collection. Symbol size is related to total PAH concentration (see key). The fitted curve describes the weathering pattern and includes only data where total PAH > 8000 ng/g. Letters (a – f) indicate samples illustrated as examples in Fig. 3.15.

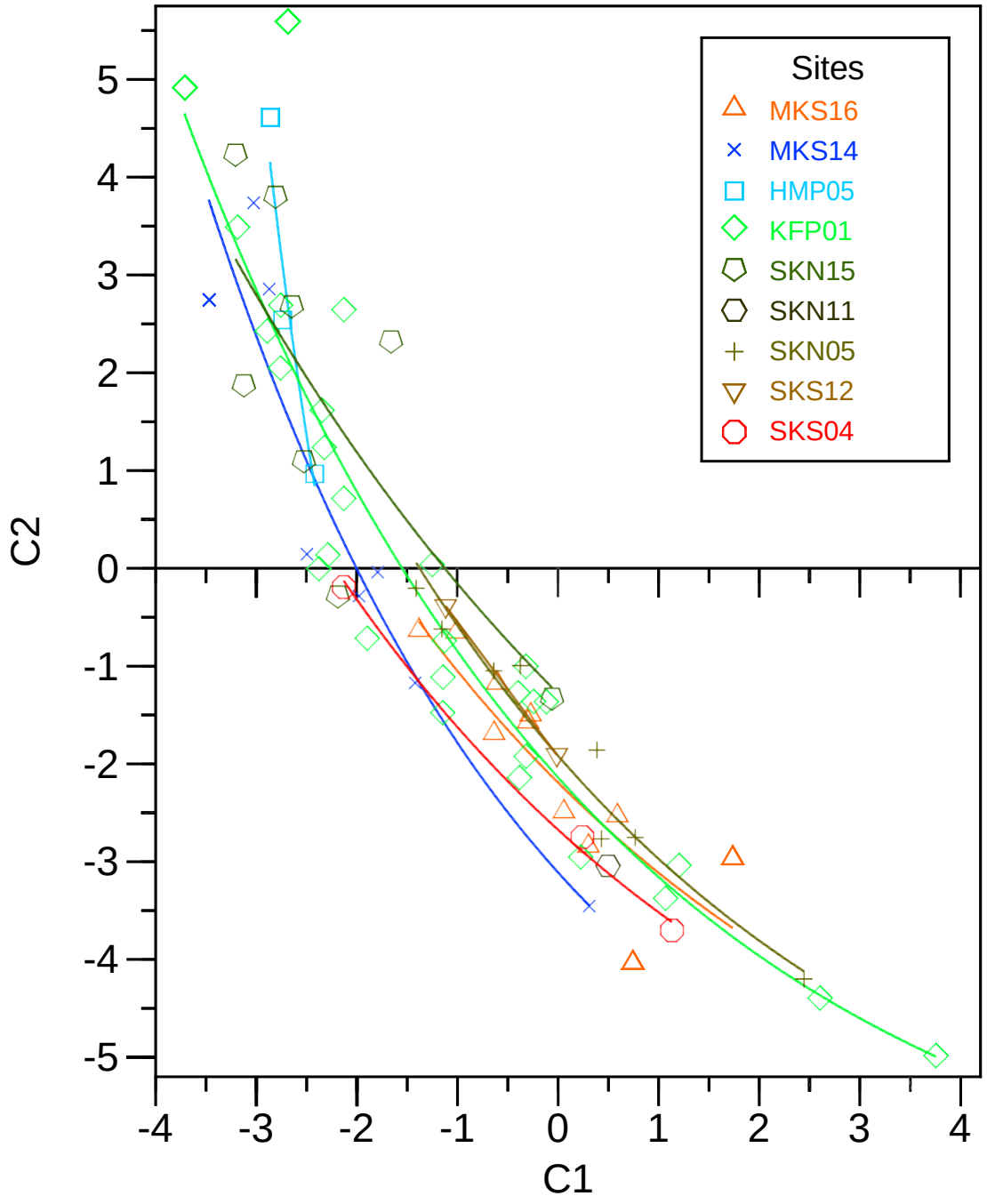

Fig. 3.14. Regressions by oiled site of the first and second principal components from the correlation matrix of normalized PAHs in sediment. These data are a subset of those illustrated in Fig. 3.13.

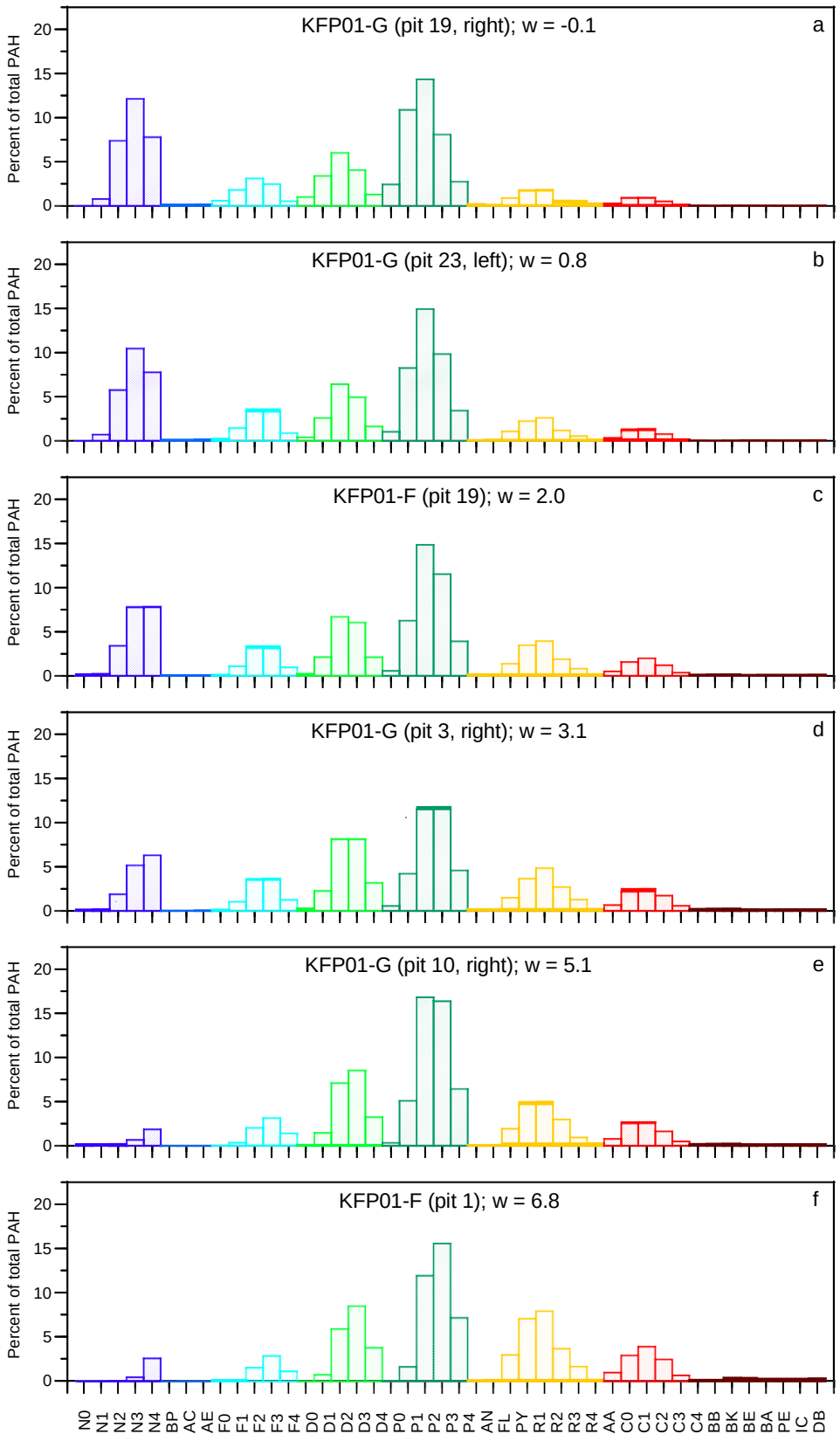

Fig. 3.15. Relative polynuclear aromatic hydrocarbon (PAH) composition in representative sediment samples collected in 2008 from least weathered (a) to most weathered (f). See Table 3.4 for abbreviations. See text for an explanation of the unitless weathering coefficient *w*.

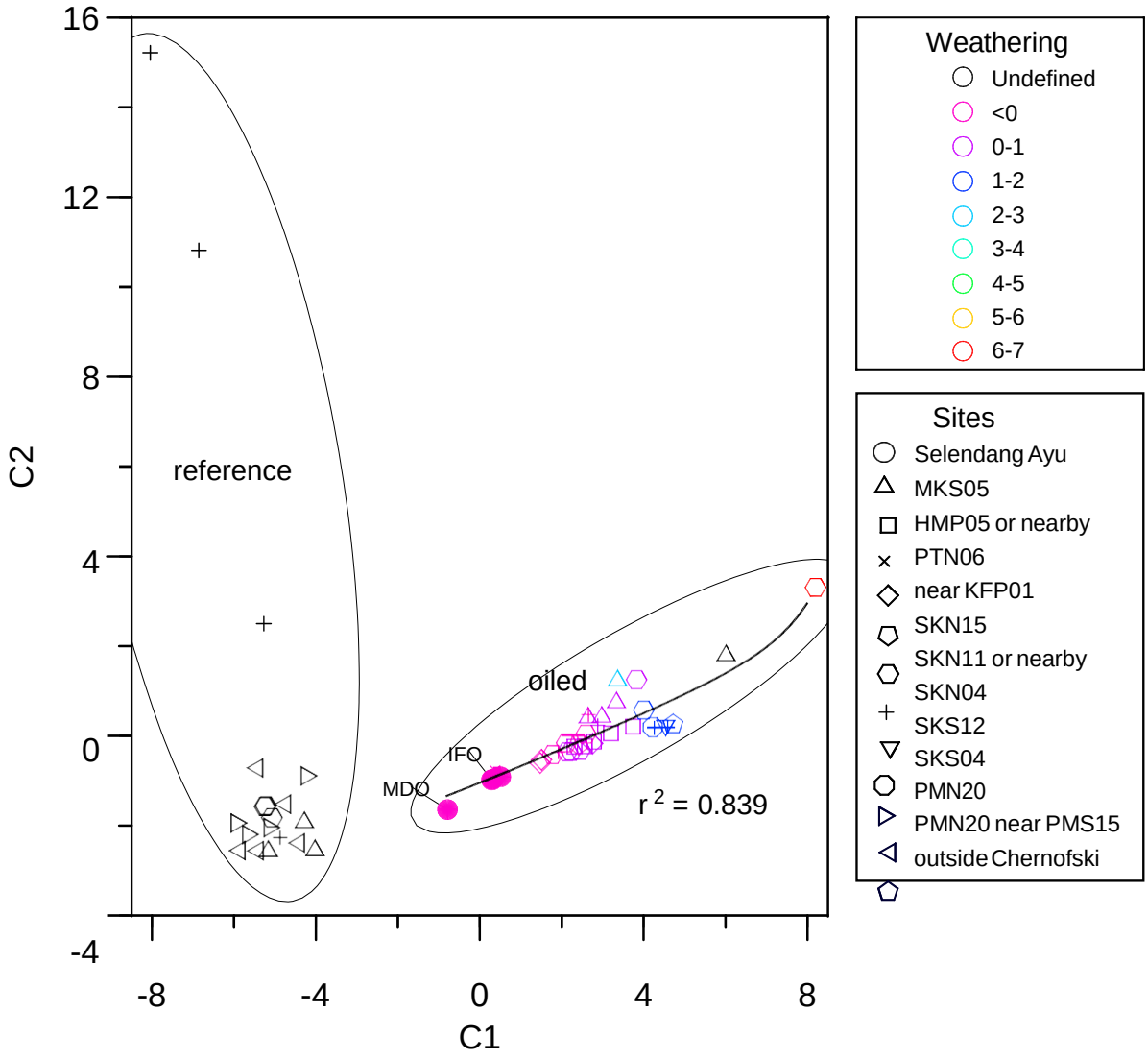

Fig. 3.16. Summary of PAHs in oil or sediment shortly after the *Selendang Ayu* spill. First and second principal components from the correlation matrix of normalized PAHs in 2004 to 2005 sediment color coded by weathering coefficient (*w*). Solid symbols indicate samples collected directly from the *Selendang Ayu*. No oil was observed in reference samples. In some cases the same area contributed both reference and oiled samples (e.g., MKS05); reference samples were collected upstream above oil influence, oiled samples were collected downstream or intertidally.

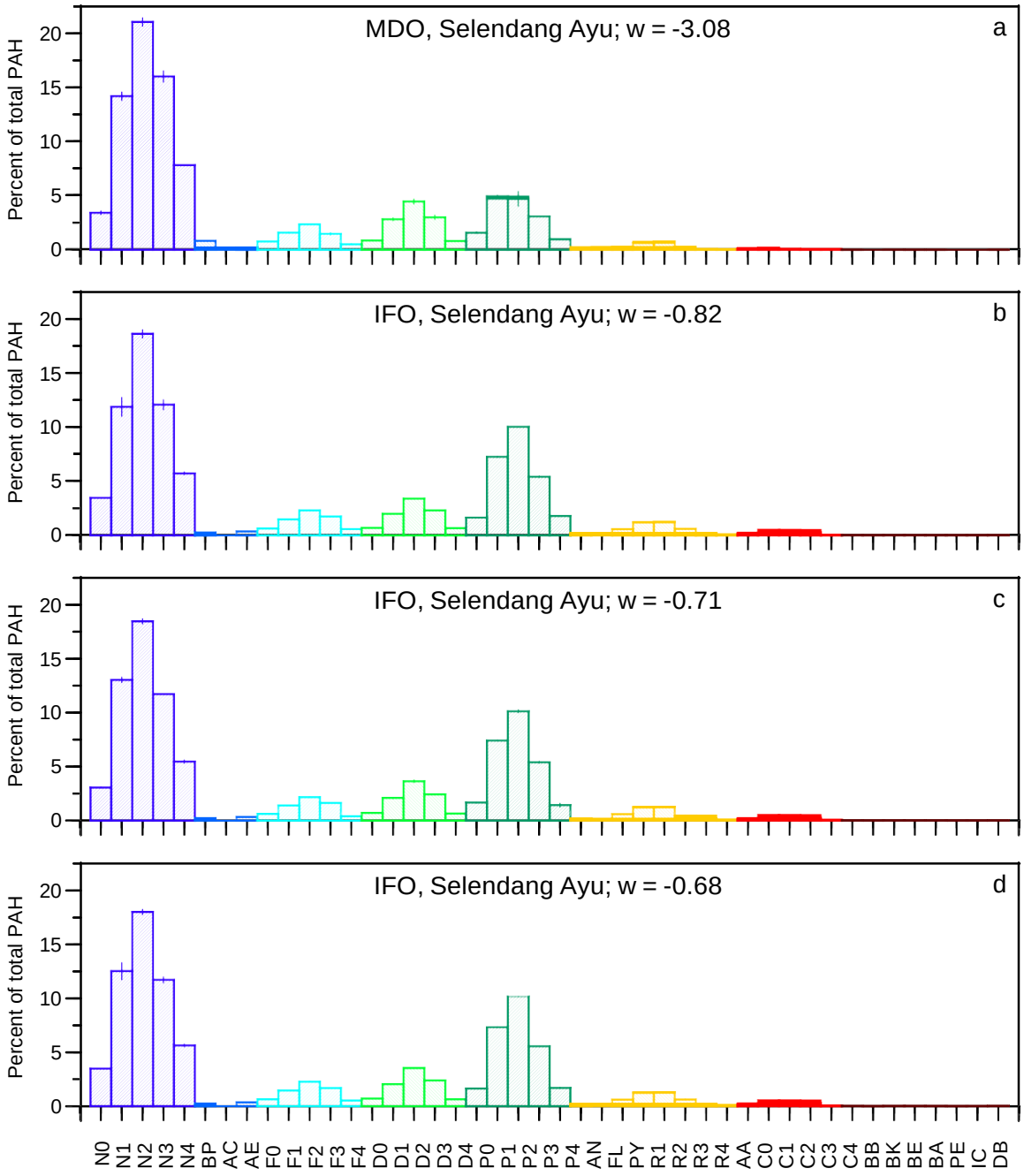

Fig. 3.17. Relative polynuclear aromatic hydrocarbon (PAH) composition in each *Selendang Ayu* oil sample collected between December 19, 2004 and January 5, 2005 from least weathered (a) to most weathered (d). Vertical bars indicate ± 1 standard error ($2 \leq n \leq 3$). See Table 3.4 for PAH abbreviations. See text for an explanation of the unitless weathering coefficient *w*.

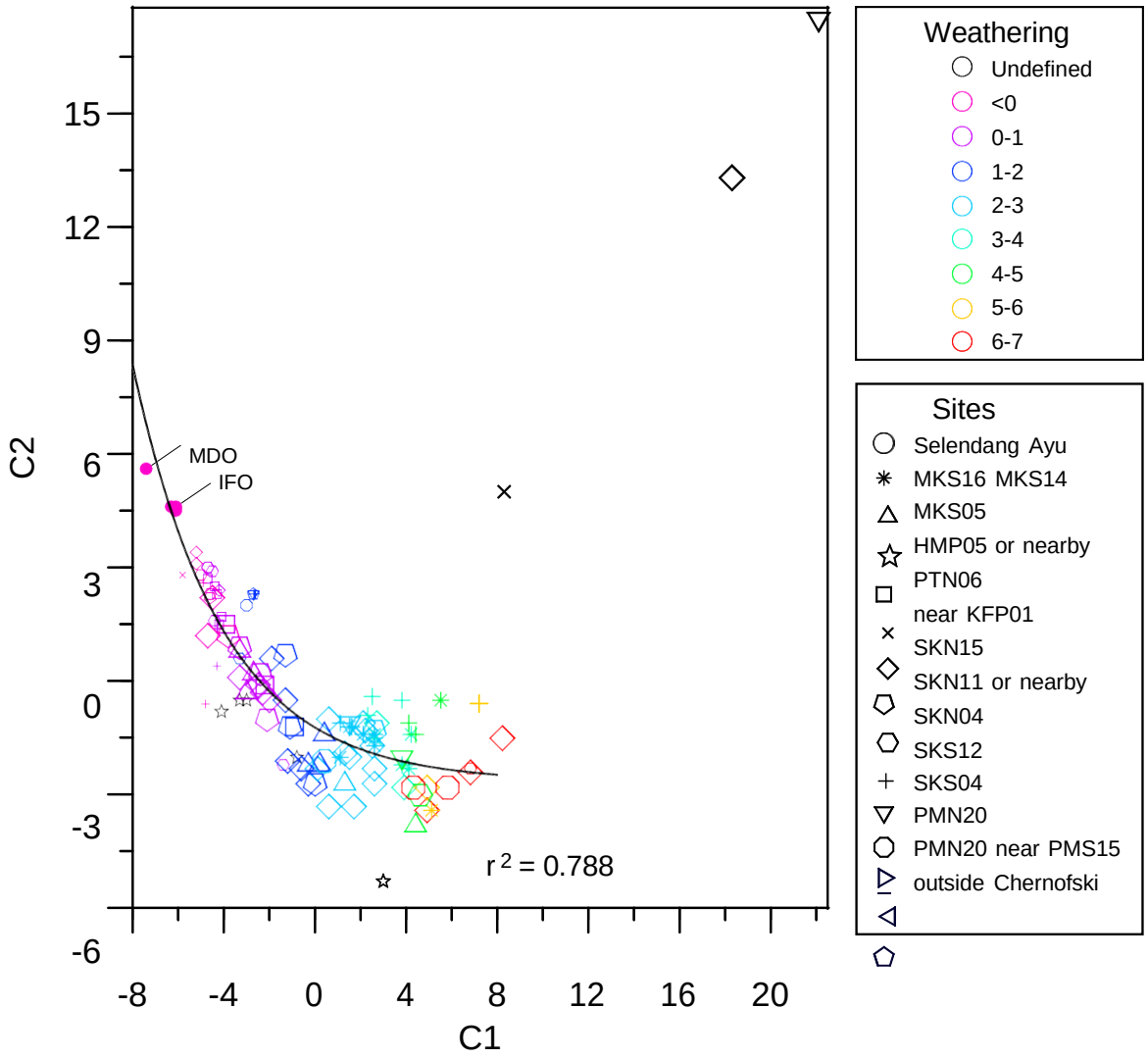

Fig. 3.18. Summary of PAHs in oil or oiled sediment (excluding references). First and second principal components from the correlation matrix of normalized PAHs in all oiled sediment samples (2004 to 2008) color coded by weathering coefficient (*w*). Solid symbols indicate samples collected directly from the *Selendang Ayu*. Samples collected in 2004 to 2005 are illustrated with small symbols. The fitted regression does not include the four stray samples where *w* was undefined.

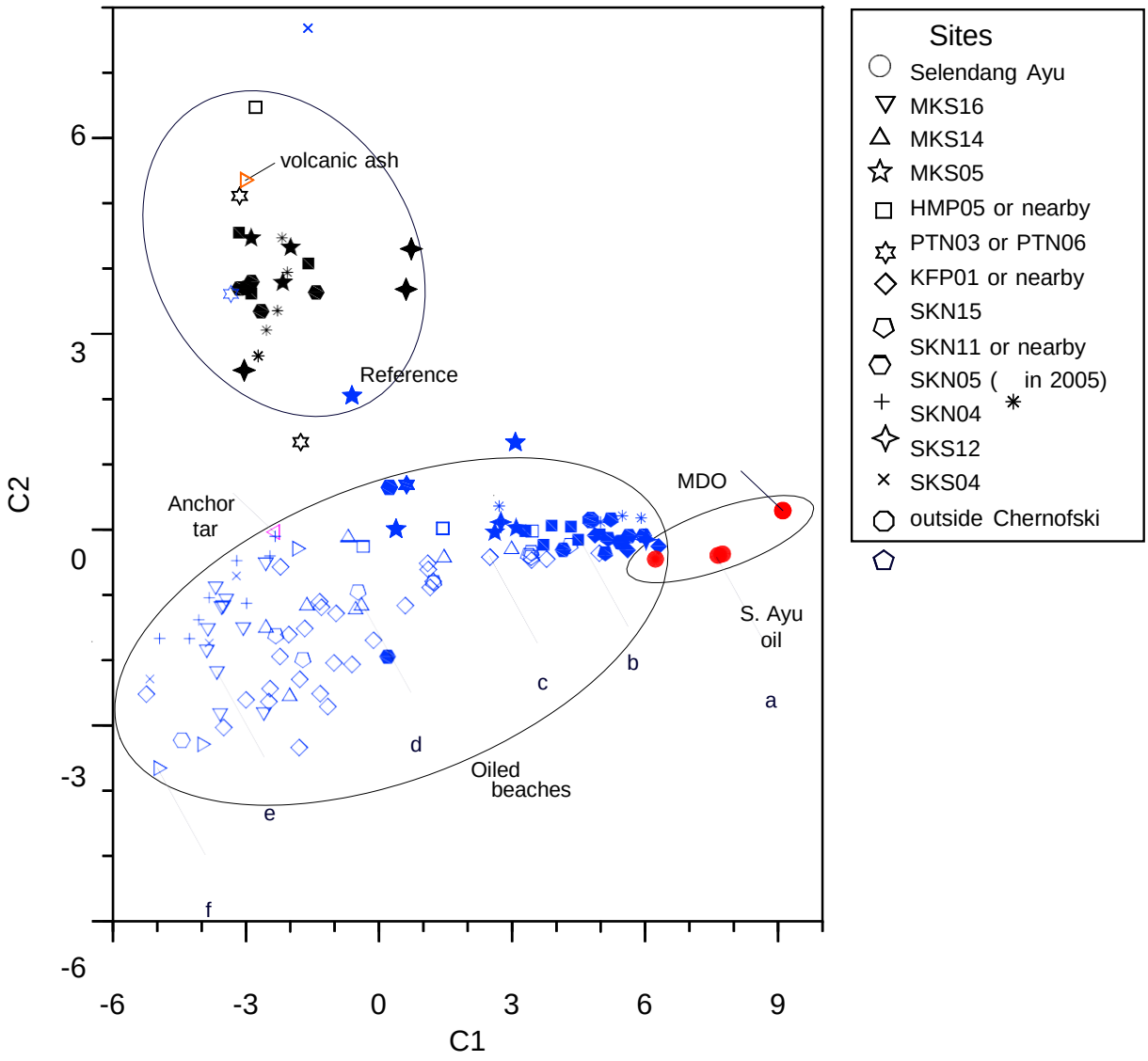

Fig. 3.19. Summary of alkanes in sediment. First and second principal components from the correlation matrix of normalized alkanes in all oil and sediment samples collected in 2004 or 2005 (solid symbols) and 2008 (open symbols). Samples collected directly from the *Selendang Ayu* are illustrated in red, oiled samples in blue, and background samples in black. Two other interesting reference samples were also included, volcanic ash from a contemporaneous eruption and anchor tar from an unknown origin. Letters (a – f) indicate samples illustrated as examples in Fig. 3.20. The first component explained 40% of the variance and C2 explained 16% of the variance.

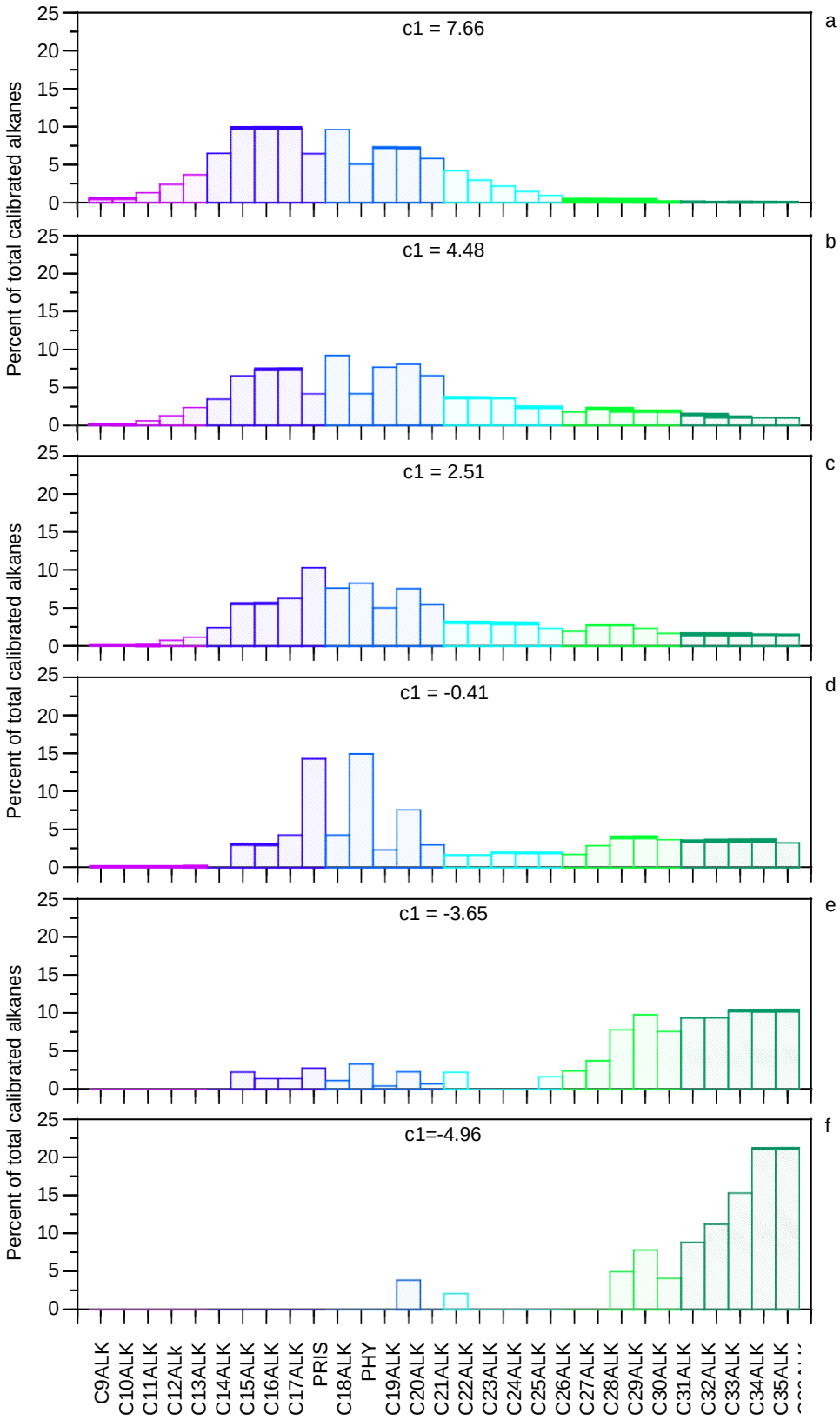

Fig. 3.20. Relative alkane composition in oil collected from the *Selendang Ayu* and oil or oiled sediment from beaches, 2004 to 2008. See Table 3.5 for abbreviations. C1 is the first principal component in the analysis illustrated in Fig. 3.19.

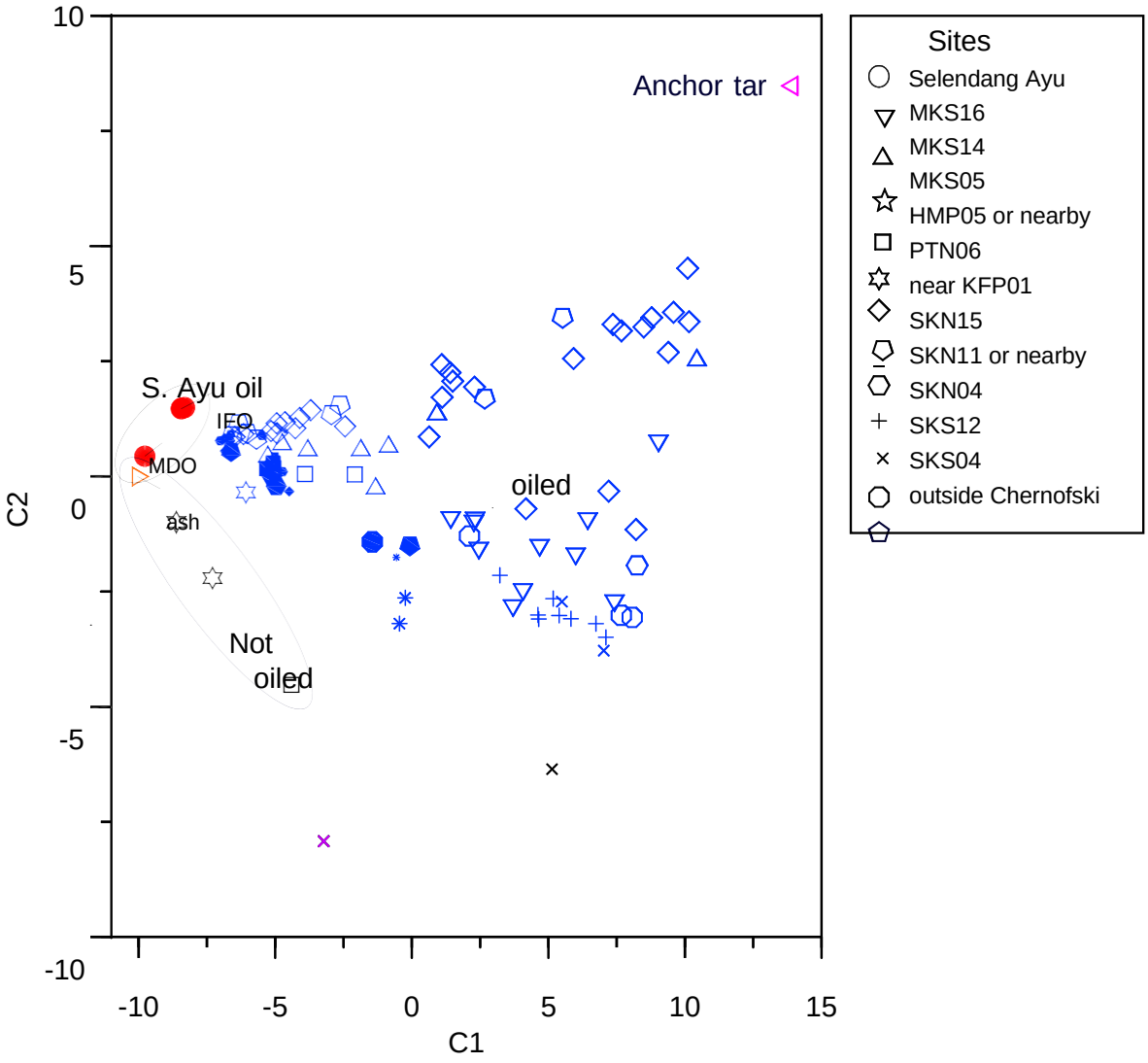

Fig. 3.21. Summary of biomarkers in sediment. First and second principal components from the correlation matrix of normalized biomarkers in all oil and sediment samples collected in 2004 or 2005 (solid symbols) and 2008 (open symbols). Samples collected directly from the *Selendang Ayu* are illustrated in red, oiled samples in blue, and background samples in black. Two other interesting reference samples were also included, volcanic ash from a contemporaneous eruption and anchor tar from an unknown origin. The first component explained 72% of the variance and C2 explained 11% of the variance.

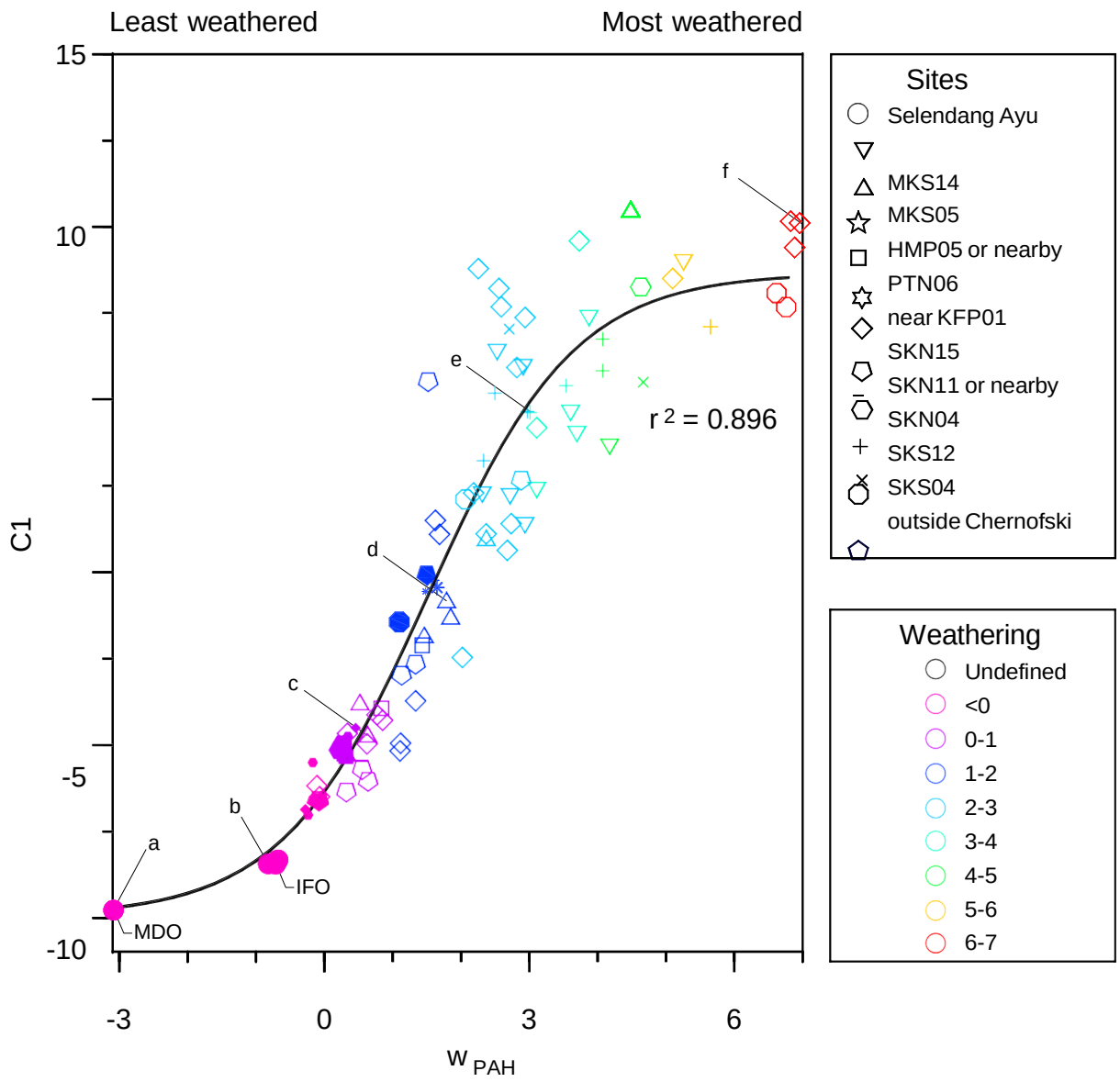

Fig. 3.22. Relationship between weathering of PAHs (w_{PAH}) and the first principal component for all biomarkers (C1) in sediment. Symbols are colored by w_{PAH} as indicated. Letters (a – f) indicate samples illustrated as examples in Fig. 3.23. See text for an explanation of the unitless weathering coefficient *w*.

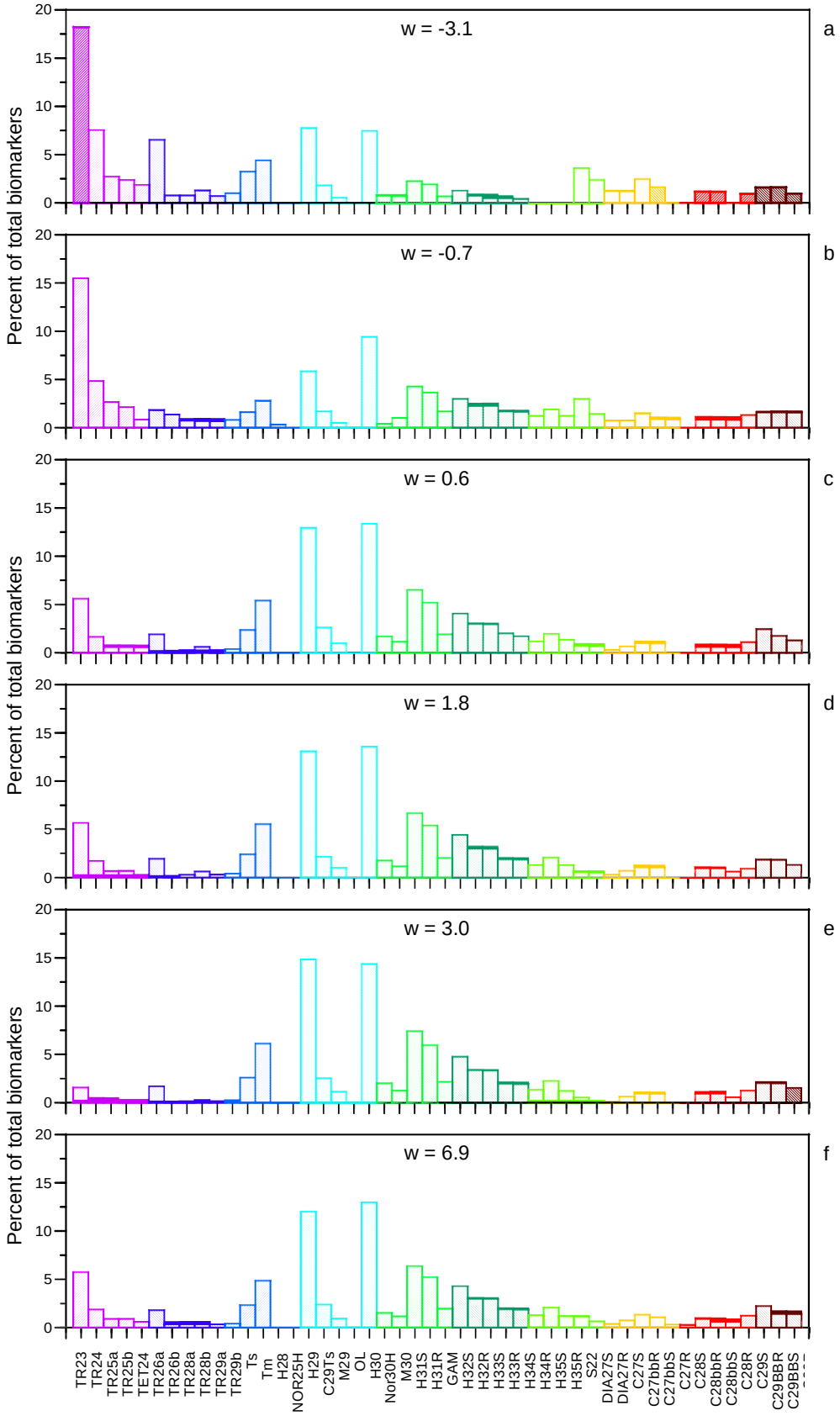

Fig. 3.23. Relative biomarker composition in oil collected from the *Selendang Ayu* and oil or oiled sediment from beaches, 2004 to 2008. See Table 3.6 for abbreviations. See also Fig. 3.22. See text for an explanation of the unitless weathering coefficient *w*.

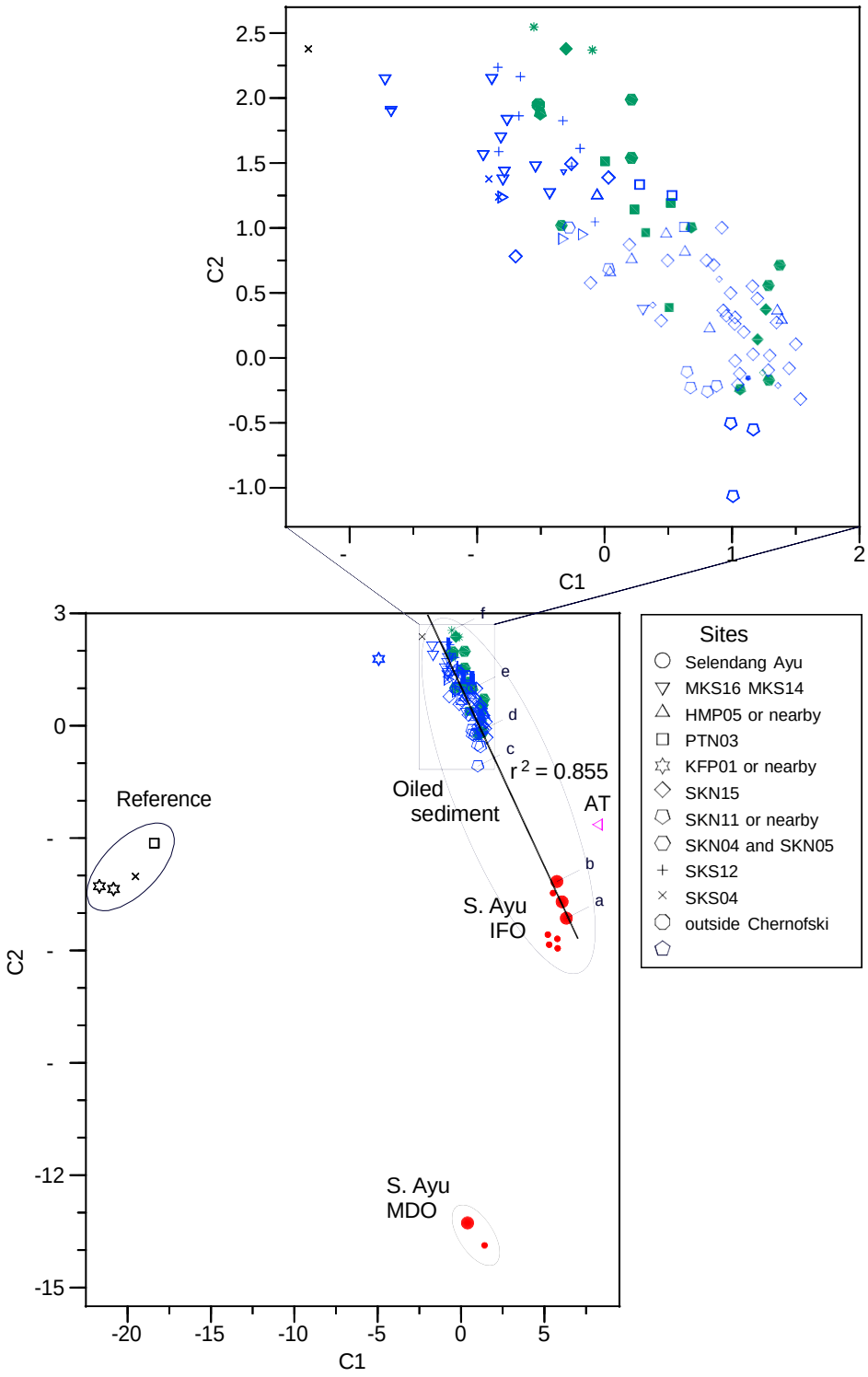

Fig. 3.24. Summary of persistent biomarkers in oil and sediment. First and second principal components from the correlation matrix of normalized persistent biomarkers (hopanes and steranes) in all oil and sediment samples collected in 2004 or 2005 (solid symbols) and 2008 (open symbols). Samples collected directly from the *Selendang Ayu* are illustrated in red, oiled samples in blue (2008) or solid green (2004 – 2005), and background samples in black. Anchor tar (AT) from an unknown origin is also included. The first component explained 51% of the variance and C2 explained 20% of the variance. Letters (a – f) indicate samples illustrated as examples in Fig. 3.25.

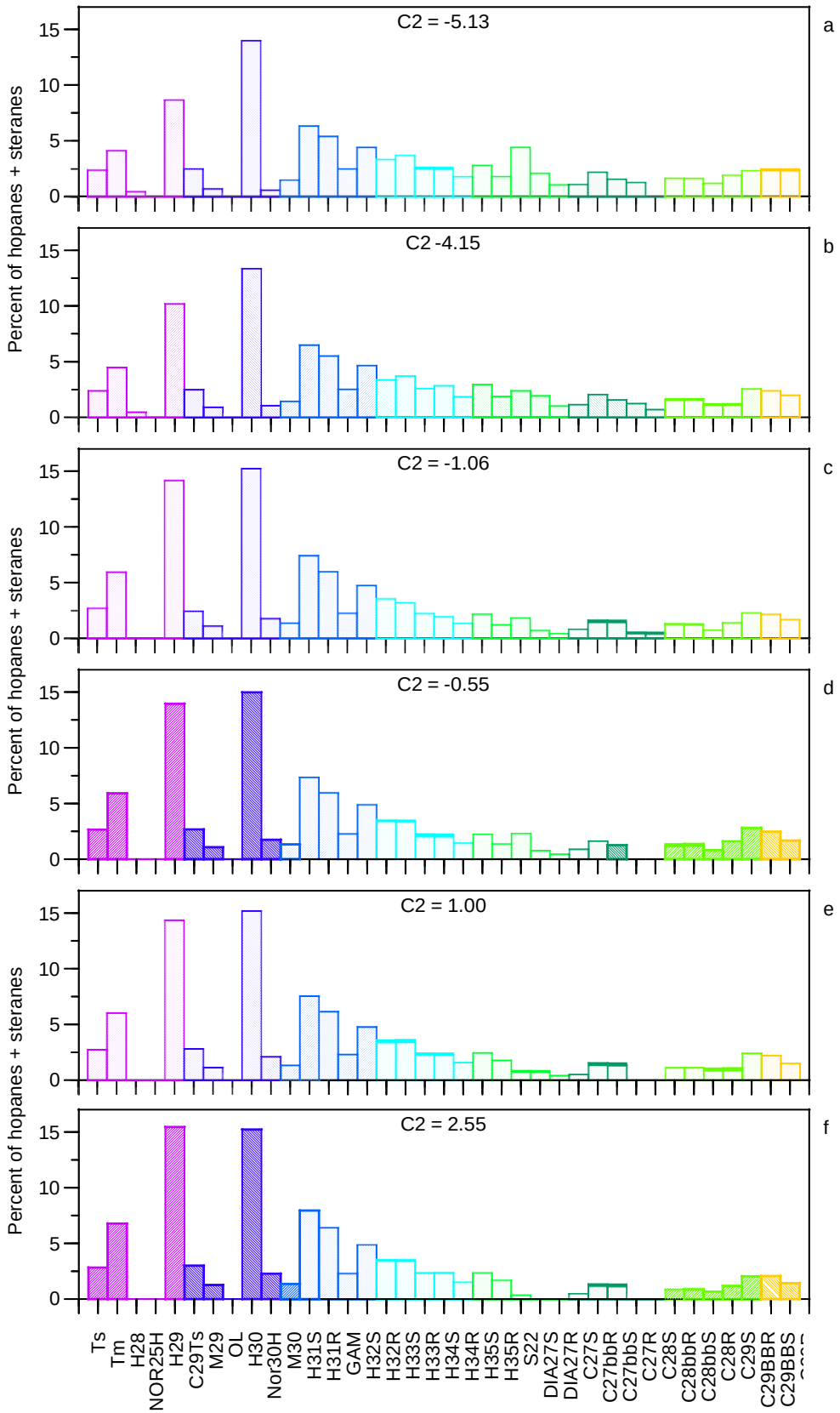

Fig. 3.25. Relative persistent biomarker composition (hopanes and steranes) in sediment collected from the *Selendang Ayu* and oil or oiled sediment from beaches, 2004 to 2008. See Table 3.6 for abbreviations. See also Fig. 3.24.