#COMMUNITY COMMENT

This study characterizes modern storm-overwash deposits in the back-barrier marsh of Chandipur, Bay of Bengal, India, using surface sediment samples collected along five shore-parallel transects in 2018. The authors combine end-member mixing analysis (EMMA) of grain-size distributions, Cailleux-based grain morphoscopy, and SEM microtextural analysis to define four grain-size end-members and three depositional clusters (aqueous, aeolian, and storm/overwash), which they propose as a multi-proxy framework for identifying storm deposits and informing paleotempestological reconstruction and coastal hazard management.

The methodology is intriguing and combines complementary techniques in a way that could meaningfully contribute to paleotempestology. However, the study lacks temporal control, offers no way to distinguish single storm events from cumulative reworking, and relies on grain classification schemes with no demonstrated reproducibility. As a result, the central claim that this proxy can reliably identify and reconstruct storm-surge deposits is not supported by the data presented. The approach shows promise but requires substantial additional development and validation before it can be considered a reliable paleotempestological proxy.

Response: We thank the reviewer for this assessment and for recognizing the potential contribution of our multi-proxy approach. We agree the manuscript did not adequately address temporal control, event differentiation, and classification reproducibility, and have revised it to address each concern directly. On preservation potential (Comment 1), Section 5.3 now cites documented cases where comparable grain-size, morphoscopic, and microtextural signatures have been successfully applied to buried Quaternary deposits (e.g. Kalińska et al., 2024), supporting the framework's relevance beyond the modern surface context studied here. On distinguishing single events from cumulative reworking and the lack of temporal control (Comments 2–3), we now explicitly acknowledge in Section 5.3 that our surface samples cannot resolve individual storms or closely spaced storm-cluster signatures, referencing studies that achieve such resolution through different proxy combinations (e.g., Dietz et al., 2021). We have reframed our objective accordingly: to characterize the sedimentological contrast between storm-affected and background deposits, rather than to attribute deposits to specific events. On grain classification reproducibility, we clarify that the Cailleux and SEM microtextural schemes used are established, widely applied methods, and that our interpretations rely on population-level patterns and cross-proxy agreement rather than individual, analyst-dependent classifications. These revisions, together with clarified figures (4, 5, 8, 10) and expanded discussion of the broader proxy landscape in Section 5.3, are intended to more accurately position our framework as a complementary, rather than standalone, sedimentological proxy for paleotempestological investigation. Detailed responses to each comment follow below:

Major Comments

#Comment 1- Proxy applicability overstated.

The authors frame this as a tool for paleotempestology but present no evidence bearing on preservation potential, i.e., whether these grain-size/morphoscopic signatures would survive burial or reworking over the timescales relevant to the paleo-record. This is never discussed.

REPLY:

We thank the reviewer for this important comment. We have addressed this point in the revised Section 5.3, which frames our findings as a modern sedimentological analogue for evaluating comparable assemblages in buried sequences. We clarify, however, that this analogue value is not unconditional: its applicability depends on the local depositional regime, and the present surface-sediment dataset cannot itself provide event-specific attribution for buried deposits. We note that event-specific interpretation of the paleo-record would require independent evidence, including stratigraphic relationships, chronology, geomorphic context, and, where possible, comparison with documented modern events. The revised passage is pasted here:

"5.3 Evaluating the implication of these sedimentological proxies for tempestological investigation

The integration of granulometric end-member modelling and quartz morphoscopy provides a more comprehensive sedimentological framework for evaluating depositional and transport conditions. End-member modelling resolves the principal sediment populations within the coastal barrier–marsh system, whereas morphoscopic and SEM observations provide information on grain shape, surface character, and mechanical modification. Their integration therefore allows sediment populations to be evaluated in terms of both grain-size characteristics and transport-related morphological attributes, while also considering their spatial distribution across the depositional environment. In the Chandipur system, this framework provides a basis for distinguishing overwash deposits from the background depositional populations. Its occurrence within the back-barrier marsh, together with its contrast with the finer inner-marsh and aeolian populations, identifies a sedimentological *association that can serve as a modern sedimentological analogue for evaluating comparable assemblages in buried sequences. This analogue, however, is not unconditional: its applicability depends on the local depositional regime and carries specific interpretive limitations. In relatively low-energy barrier–marsh environments, an episodically introduced coarse sediment population may provide a stronger contrast with background deposition, whereas persistent reworking for longer periods may produce greater overlap among transport-related sediment characteristics. A further limitation is that the present surface-sediment dataset cannot provide event-specific attribution. The samples represent the modern sedimentary system and may incorporate sediment deposited during multiple episodes of inundation, reworking, and redistribution. Relatedly, the present proxies cannot resolve the signatures of successive storm events occurring in close temporal succession (storm-cluster deposits); differentiating such closely spaced events has been demonstrated using geochemical and sedimentological proxies for Hurricanes Gustav and Ike (2008) at Bay Champagne (Dietz et al., 2021), suggesting that comparable multi-proxy resolution may be required to isolate storm-cluster signatures. On the other hand, Yao et al. (2023) demonstrated that the effectiveness of sedimentological, geochemical, and biological proxies for identifying storm-surge deposits varies among depositional environments. In their sand-limited, peat-dominated coastal setting, only a subset of the investigated parameters significantly differentiated storm-surge from in-situ sediments, with mean grain size providing useful discrimination while some geochemical parameters were ineffective. Event-specific interpretation of buried deposits would therefore require independent evidence, including stratigraphic relationships, chronology, geomorphic context, and, where possible, comparison with documented modern events. Taken together, the integrated granulometric–morphoscopic–micromorphological framework provides a basis for evaluating whether a sedimentary assemblage is consistent with episodic high-energy allochthonous deposition within natural depositional setting. Its principal value lies in identifying coherent contrasts between event-related sediment populations and the local background regime, particularly within barrier–marsh systems where such contrasts may be preserved. The framework can therefore provide an independent and complementary sedimentological line of evidence for paleotempestological investigations alongside geochemical, chronological, stratigraphic, and other proxy-based approaches, rather than serving as a standalone indicator of individual storm events.”*

#Comment 2- No mechanism for differentiating stacked or successive events.

Although the paper discusses resuspension and reworking, it never addresses how a single overwash event's signature would be distinguished from the cumulative effect of multiple prior events, or how much of the observed pattern reflects post-storm quiescent reworking (e.g., aeolian) rather than the storm itself. This is a core requirement for any proxy intended for paleotempestological use, and it is absent.

REPLY:

We thank the reviewer for this important observation. We agree that the present sampling strategy and sedimentological characteristics do not allow individual overwash events to be separated from cumulative deposition or subsequent reworking. We have therefore explicitly acknowledged this limitation in Section 5.3, which is pasted here

"*This analogue, however, is not unconditional: its applicability depends on the local depositional regime and carries specific interpretive limitations. In relatively low-energy barrier–marsh environments, an episodically introduced coarse sediment population may provide a stronger contrast with background deposition, whereas persistent reworking for longer periods may produce greater overlap among transport-related sediment characteristics. A further limitation is that the present surface-sediment dataset cannot provide event-specific attribution. The samples represent the modern sedimentary system and may incorporate sediment deposited during multiple episodes of inundation, reworking, and redistribution. Relatedly, the present proxies cannot resolve the signatures of successive storm events occurring in close temporal succession (storm-cluster deposits); differentiating such closely spaced events has been demonstrated using geochemical and sedimentological proxies for Hurricanes Gustav and Ike (2008) at Bay Champagne (Dietz et al., 2021), suggesting that comparable multi-proxy resolution may be required to isolate storm-cluster signatures*."

#Comment 3- No temporal control.

Samples were collected in 2018 in what appears to be a single field campaign (Section 3, lines 116–120), with no indication of sampling relative to a specific storm's timing, nor repeat sampling to track change over time. Section 4.6 lists multiple 2018 storm/depression events (Tropical Storm Daye, Cyclone Titli, and three depressions) without establishing which, if any, produced the sampled deposits, or discussing whether this was a typical or anomalous year for the region. Critically, while individual storms and depressions are named, none of the granulometric, morphoscopic, or microtextural data are tied to a specific one of these events, so even with the storms listed, the paper cannot attribute its "storm cluster" signature to a particular storm or distinguish the contribution of one event from another.

REPLY:

We thank the reviewer for highlighting this important point. The Bay of Bengal is frequently affected by tropical cyclones, with cyclonic events occurring almost every year in the region (Bushra et al., 2019), and the study area is consequently exposed to recurrent high-energy events. The overwash sampling was completed approximately two weeks after Cyclone Titli made landfall in October 2018. Therefore, given the short interval between the storm and sampling, we consider substantial post-depositional reworking of the sampled washover deposit unlikely. Although other pre-cyclonic storms had also affected the region, our objective was not to differentiate or attribute the deposit to individual storm events, but rather to delimit the sedimentological characteristics of storm-affected deposits from the background sedimentary deposits. We agree that the observed "storm cluster" signature cannot be attributed to a particular cyclone, and we have therefore revised the manuscript accordingly and explicitly acknowledged this limitation in the revised discussion. The revised portion is pasted here:

"*A further limitation is that the present surface-sediment dataset cannot provide event-specific attribution. The samples represent the modern sedimentary system and may incorporate sediment deposited during multiple episodes of inundation, reworking, and redistribution. Relatedly, the present proxies cannot resolve the signatures of successive storm events occurring in close temporal succession (storm-cluster deposits); differentiating such closely spaced events has been demonstrated using geochemical and sedimentological proxies for Hurricanes Gustav and Ike (2008) at Bay Champagne (Dietz et al., 2021), suggesting that comparable multi-proxy resolution may be required to isolate storm-cluster signatures*."

#Comment 4- Poor separation between aeolian and overwash end-members.

EM-3 (aeolian, modal 2.8φ) and EM-4 (overwash, modal 2.4φ) have substantially overlapping size ranges — Figure 10 lists EM-3 as 4.0φ–1.6φ and EM-4 as 3.8φ–1.1φ, an overlap spanning roughly 3.8φ–1.6φ. Given this, it's unclear how confidently the two processes can be distinguished by grain size alone, undermining the paper's central diagnostic claim.

REPLY: We thank the reviewer for highlighting this important point. We agree that EM-3 and EM-4 have substantially overlapping grain-size ranges. Previous studies have similarly noted that the particle-size distributions of aeolian deposits and washover sediments can overlap considerably, even where the two are derived from distinct transport processes (Rodriguez et al., 2013). In our case as well, the EM-3 and EM-4 distributions are not resolved as fully discrete populations on grain size alone, and we do not rely on grain size in isolation to distinguish the two processes. Nevertheless, we agree that the overlap makes it difficult to distinguish the two processes using grain size alone. We have therefore strengthened our interpretation using additional proxies and depositional context. Specifically, the process interpretation is based on the combined relationships among grain-size end-members, quartz morphoscopic characteristics, and spatial distribution. EM-3 is predominantly associated with RM and EM/RM grains and barrier-proximal settings, consistent with aeolian sediment input, whereas EM-4 is associated with C and NU grains and is concentrated in the northeastern and central back-barrier sectors, indicating relatively higher-energy sediment transport.

#Comment 5- Grain classification relies on subjective visual assessment with no reported reproducibility check.

Both the Cailleux morphoscopic categories and the SEM-based microtextural scoring depend on a single analyst's visual judgment, and the qualitative category definitions (e.g., "partially-rounded," matte surface "limited to the most convex parts") leave real room for inconsistent classification. No inter-analyst reliability or repeat-scoring check is reported for either scheme. Since these classifications feed directly into the cluster analysis underlying the paper's central claims, this is a meaningful gap for a paper proposing a new proxy.

REPLY: We thank the reviewer for raising this point. We respectfully note that the morphoscopic and SEM-based classifications employed here follow established and widely applied approaches for interpreting quartz-grain surface characteristics, rather than representing newly developed subjective classification schemes. Comparable applications have successfully used these morphological and microtextural characteristics to distinguish depositional environments (for grain morphoscopy: e.g., Machado et al., 2016; Martewicz et al., 2022; for SEM microtextures: e.g., Costa et al., 2012; Bellanova et al., 2016; Kalińska-Nartiša et al., 2018, 2024; Hossain et al., 2024; Kalińska et al., 2025). The criteria used in our study are based on recognizable, operationally defined grain-shape and surface-texture attributes, and the observations were applied consistently across the analysed grain populations. Importantly, individual visual classifications were not treated as independently diagnostic of depositional processes; rather, their significance derives from the relative abundance and distribution of morphological/microtextural populations and their agreement with the independent grain-size and EMMA evidence. Thus, while observer judgement is inherent to established morphoscopic approaches, we consider the classification sufficiently reproducible for population-level sedimentological interpretation and not a standalone determinant of the proposed proxy.

#Comment 6- Authors don't fully engage with the existing proxy landscape.

The Introduction (lines 42–44) cites Yao et al. (2023) for the documented unreliability of geochemical proxies in some coastal settings, using this as partial motivation for proposing a granulometric/morphoscopic alternative. However, the paper never returns to this point to demonstrate that its own proxy avoids the same pitfalls Yao et al. identified: no comparison, no discussion of what made those geochemical proxies fail, and no argument for why a grain-size/morphoscopic approach would be more robust in the same failure conditions. This is consistent with the authors' general lack of engagement with the broader array of proxies used in paleotempestology, treating the presence or absence of microfossils as though it were the primary alternative to their approach.

REPLY:

We thank the reviewer for this important comment. We have expanded the discussion in Section 5.3 to engage more explicitly with the broader paleotempestological proxy framework and the section is pasted below. We also emphasize that proxy performance is strongly dependent on the depositional environment and acknowledge that grain-size and grain-surface characteristics may likewise lose discriminatory value in persistently energetic or frequently reworked settings. We have therefore avoided presenting the granulometric–morphoscopic framework as universally superior to geochemical or biological proxies and instead clarify that it provides an independent and complementary sedimentological line of evidence alongside geochemical and other paleotempestological proxies rather than replacing them. We have also expanded the Introduction to recognize granulometric, morphoscopic, and other proxy approaches beyond microfossil evidence.

"On the other hand, Yao et al. (2023) demonstrated that the effectiveness of sedimentological, geochemical, and biological proxies for identifying storm-surge deposits varies among depositional environments. In their sand-limited, peat-dominated coastal setting, only a subset of the investigated parameters significantly differentiated storm-surge from in-situ sediments, with mean grain size providing useful discrimination while some geochemical parameters were ineffective. Event-specific interpretation of buried deposits would therefore require independent evidence, including stratigraphic relationships, chronology, geomorphic context,

and, where possible, comparison with documented modern events. Taken together, the integrated granulometric–morphoscopic–micromorphological framework provides a basis for evaluating whether a sedimentary assemblage is consistent with episodic high-energy allochthonous deposition within natural depositional setting. Its principal value lies in identifying coherent contrasts between event-related sediment populations and the local background regime, particularly within barrier–marsh systems where such contrasts may be preserved. The framework can therefore provide an independent and complementary sedimentological line of evidence for paleotempestological investigations alongside geochemical, chronological, stratigraphic, and other proxy-based approaches, rather than serving as a standalone indicator of individual storm events."

#Comment 7- Figures are frequently unclear

(see specific examples in minor comments below — Figures 4, 5, and 8 in particular).

REPLY: As suggested, we have made required changes in the figures. The detailed changes are provided in the minor comment section.

#Minor comments

#Comment 1- *No clear demonstration that "high-energy" grain features (cracked/C-type grains) specifically indicate storm transport as opposed to other high-energy aqueous processes.*

REPLY: We thank the reviewer for this observation. We agree that fractured grains alone are not uniquely diagnostic of storm activity, as similar features can arise from recycling, swash processes, mechanical weathering, or fluvial transport. In our study, the C-type grains gain interpretive significance through their co-occurrence with the coarsest fraction (EM4) and fresh angular NU grains, together indicating a higher-energy transport history than the other clusters. Their retained angularity within the interior back-barrier marsh is notable because sustained local reworking (e.g., prolonged littoral drift or swash action) would instead be expected to progressively round and smooth grain edges (Mycielska-Dowgiałło & Woronko, 1998; Kalińska-Nartiša et al., 2018). This, combined with SEM evidence of fresh conchoidal fractures and percussion marks (Costa et al., 2012, 2017; Kalińska-Nartiša et al., 2018, 2024), favors episodic high-energy input over sustained local reworking. Storm-driven inundation is a well-documented mechanism for such landward transport of coarse, angular sediment (Morton, 1981; Möller et al., 2014), consistent with modern overwash analogues (Hong et al., 2018; Castagno et al., 2021). We have accordingly clarified that C-type grains are interpreted as storm-consistent only jointly with this combined evidence, not as an independent indicator.

#Comment 2- ***Line 30****: "storm surges sediments landward" — strange phrasing; likely missing a verb or should read "storm surge transports sediments landward."*

REPLY: As suggested, the sentence has been modified.

#Comment 3- ***Line 37–38****: Paleotempestology is introduced but its relevance to this specific study's findings/methods is never revisited or discussed.*

REPLY: We thank the reviewer for this observation. Section 5.3 has been revised to explicitly discuss the relevance of paleotempestology to our findings, noting that the integrated granulometric–morphoscopic–micromorphological framework can serve as a modern sedimentological analogue for evaluating comparable assemblages in buried sequences, while also outlining its interpretive limitations (event-specific attribution, storm-cluster resolution) so that the framework is presented as a complementary line of evidence for paleotempestological investigation rather than a standalone indicator of individual storm events.

#Comment 4- *Rationale for site selection is missing: Why Bay of Bengal/Chandipur specifically? No discussion of regional tropical meteorology, whether the site is a good sediment repository (vs. continually reworked), or prior overwash studies at this location to justify testing a new proxy here.*

REPLY: We thank the reviewer for this suggestion. We have clarified the rationale for selecting Chandipur and the northeastern Bay of Bengal in the Introduction by highlighting the region's high exposure to tropical cyclones and storm surges and the presence of a sandy barrier adjacent to a sheltered back-barrier marsh, which provides an appropriate setting for investigating storm-related sediment transport and deposition.

#Comment 5- *Sampling design not justified: why five shore-parallel transects, why this spacing/resolution, and why surface samples only rather than cores (which would provide the vertical/temporal context this proxy needs)?*

REPLY: We thank the reviewer for this valuable suggestion. The five shore-parallel transects and sampling intervals were selected to ensure systematic spatial coverage of the study area.

Surface sampling was adopted to characterize recent storm deposits and their relationship with background sedimentary processes, rather than to reconstruct prehistoric storm/cyclone events.

#Comment 6- ***Lines 90–91****: "modern analog" claim — unclear, since there's no before/after or repeat sampling around a specific storm event.*

REPLY: We thank the reviewer for this observation. We have clarified the use of the term "modern analogue" throughout the manuscript to indicate a modern sedimentological analogue rather than an event-specific analogue of a documented storm deposit. We now explicitly acknowledge that the present surface-sediment dataset cannot attribute the observed characteristics to an individual storm and that event-specific interpretation requires independent chronological and stratigraphic evidence.

#Comment 7- ***Line 183****: "temsological" — appears to be a typo.*

REPLY: As suggested, the word has been corrected

#Comment 8- ***Lines 227–229****: Poor sorting in transects 1–2, moderate-to-poor in 3–5 — no interpretation offered as to whether this is normal for the beach or diagnostic of anything; no clear grain-size pattern differentiates the transects.;* ***Figure 2****: Sorting values plotted but not discussed quantitatively.*

REPLY: We thank the reviewer for this helpful observation. The Results section has been rewritten to provide a clearer and better description of the grain size and sorting characteristics across all five transects.

#Comment 9- ***Figure 4****: Scale bar has no stated units (presumably %); using an identical color ramp for all four EM panels invites direct visual comparison between EMs that may not be valid.*

REPLY: The colour scale in Figure 4 has been revised to clearly indicate the percentage contribution (%) of each end-member.

#Comment 10- ***Figure 5****: Confusing; category labels (RM, EM/RM, EL, etc.) would benefit from being tied more explicitly to the grain-shape photos in Figure 6.*

REPLY: We acknowledge that these terms may be unfamiliar to some readers; however, RM, EM/RM, EL, etc. are established categories in grain-shape analysis. The corresponding representative photographs are already provided in Figure 6, with the category labels clearly indicated, and their details are also explained in the figure caption.

#Comment 11- ***Lines 264–266, 272–273, 275–276***: *These are interpretive statements (aqueous origin, wind transport, storm-grain resemblance) placed in the Results section rather than Discussion.*

REPLY: As suggested, we have modified the statements.

#Comment 12- ***Line 317***: *SEM microtexture analysis was performed only on Cluster 3 (the "stormy" cluster). No SEM comparison data exist for Clusters 1 and 2, so the microtextural "signature" of storm deposits is never contrasted against non-storm SEM data.*

REPLY: We thank the reviewer for raising this point. The mechanical, chemical, and shape-based microtextural criteria used here to characterize storm-associated grains were already established and differentiated from non-storm/background signatures in the foundational studies of Costa et al. (2012), including through study microtextural variation with compared to their principal sedimentary sources. We therefore applied this pre-validated microtextural framework directly to Cluster 3 to evaluate consistency with storm-related transport, rather than re-establishing the storm/non-storm contrast independently within our own dataset.

#Comment 13- ***Figure 8***: *The y-axis conflates two different ordinal scales — Angularity uses the Powers (1953) 0–5 roundness scale, while Fresh Surface/Percussion Marks/Adhering Particles/Dissolution use a separate 0–5 "proportion of surface occupation" scale — plotted on the same axis without clear distinction.*

REPLY: We thank the reviewer for this observation. Following the conventional approach established by Costa et al. (2012), grain-surface microtextures were grouped into five families i.e. angularity, fresh surfaces, percussion marks, adhering particles, and dissolution, each scored on a comparable 0–5 ordinal scale, with angularity following the Powers (1953) scale and the remaining four families scored by relative proportion of surface occupation. Plotting these ordinal scores together on a single axis is standard practice in this microtextural literature and facilitates direct visual comparison of relative feature intensity across environments, rather than implying that the scales are quantitatively equivalent. We have clarified this distinction in the figure caption to avoid any impression that the two scale types are being treated as identical.

#Comment 14- ***Section 4.6***: *No context on whether 2018 was a typical or unusual storm year for the region.*

REPLY: We thank the reviewer for this observation. The relevant statement has been revised to provide appropriate context regarding the storm activity during 2018.

#Comment 15- ***Lines 356–362****: The text first describes EM-3 transport under "favorable weather conditions" (i.e., normal/background), then invokes strong-wind resuspension for the same fraction, with no way to distinguish the two regimes from the data. This directly undercuts the proxy's usefulness.*

REPLY: We thank the reviewer for highlighting this inconsistency. We agree that invoking both "favorable weather conditions" and "strong-wind resuspension" as separate transport regimes for the same EM3 fraction was not supported by the dataset, since the surface-sediment samples cannot independently resolve calm-wind versus high-wind aeolian transport events. We have therefore revised this section to remove the dual-regime framing and present a single, internally consistent transport interpretation for EM3, based on its spatial association with the barrier-proximal transects and its consistency with the matte/frosted grain-surface signature (RM and EM/RM categories) diagnostic of aeolian modification. The revised text now attributes the EM3 population to aeolian transport from exposed barrier or dune surfaces, with its clr-transformed score distribution and landward decline explained by attenuation due to increased vegetation-related surface roughness, rather than by an unresolvable distinction between wind-strength regimes. The revised passage reads as follows:

"In contrast to the fine-grained inner marsh, Cluster 2 occupies the barrier-proximal transects (CL-1 and CL-2) across the southwestern and central sectors (Figure 9; Figure 11). These samples are characterized by elevated contributions of the fine-sand end member EM3, coupled with greater proportions of whole or partially matte, frosted quartz grains belonging to the RM and EM/RM categories (Figure 7). The prevalence of matte and frosted surfaces is consistent with mechanical modification during subaerial aeolian transport (Cailleux, 1942; Kalińska-Nartiša et al., 2018). The spatial association of this sediment population with the barrier-proximal transects suggests that sediment derived from exposed barrier or dune surfaces may contribute to deposition along the adjacent marsh margin through aeolian transport (de Groot et al., 2011; Lenz et al., 2023; Rodriguez et al., 2013). Clr-transformed EM3 scores exhibit a correspondingly dispersed pattern concentrated along these barrier-proximal transects, with some pockets of contribution extending into the landward transects (Figure 9). The marked landward decline of the EM3 sand fraction beyond the barrier-proximal transects is consistent with attenuation of aeolian sediment transport across the vegetated marsh surface, where increased surface roughness and vegetation may reduce near-surface wind transport and promote sediment trapping (Arens, 1996; French & Spencer, 1993; Rodriguez et al., 2013)."

#Comment 16- ***Lines 369–371****: Claim that EM-4 transport is "particularly prominent during storm events" is asserted without citation or supporting temporal data.*

REPLY: We thank the reviewer for highlighting this issue. The unsupported statement that EM-4 transport is "particularly prominent during storm events" has been removed. In the revised manuscript, EM-4 is interpreted as the coarsest sediment population, and its association with angular C-type and fresh angular NU grains is discussed as evidence of relatively higher-energy transport. Storm-driven overwash is presented only as a plausible process consistent with this combined sedimentological evidence, rather than as a direct temporal attribution.

#Comment 17- ***Line 381****: Figure 10 (which most directly supports the cluster/depositional-environment discussion here) is not cited in this paragraph — only Figure 9 is cited nearby (line 385).*

REPLY:

As suggested, we have included the figure 10 citation in newly written discussion portion.