CONCLUSION

A large number of CFD simulations involving urban prototypes and two case studies was performed aiming to verify the strength on the relationships between the built environment and the ΔCp distribution in several urban scenarios for parallel, perpendicular and oblique wind directions. Both the H/W and the Abuilt/ Aurb aspect ratios on the windward side of the target area are mandatory on the definition of the airflow field and the Cp on the buildings envelope. A comparison of Cathays Campus ΔCp results showed strong correlation between this actual urban area and the comparable prototype A1 for three wind directions, while other three showed moderate to low correlation. Contrastingly, a stronger link was found with overall dissimilar prototypes but whose urban shape is related to this real urban area on its windward side. The combined analysis between the Paulista Ave. and the D4 prototype showed strong statistical strength between both the physical aspect ratios and the ΔCp results for five wind directions assessed. This is consistent with the hypotheses and the objectives of this investigation. Based on these findings it may be affirmed that the relationship between the various physical dimensions which characterize the urban environment in terms of its urban aspect ratios have proved to be related to the resultant ΔCp in buildings when associated with air flow data. Therefore, it seems possible to create an empirical scale that permits to estimate the ΔCp results. Although such method requires further research and validation before its application as a practical tool, such scale would be helpful for architects, building engineers and urban planners on designing naturally ventilated buildings.

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