

README file for the supplementary material included in “Scaling of wall-pressure-velocity correlations in high Reynolds number turbulent pipe flow”

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This document provides an overview of the data provided in the Supplementary Material to the publication in the title of this document (published in the *Journal of Fluid Mechanics*). All data contained in this repository serve as a mean to recreate a selection of figures found in the manuscript:

- **Fig. 2a,b.:** Probability density functions of the wall-pressure fluctuations.
- **Fig. 3a,b.:** Spectra of the wall-pressure fluctuations.
- **Fig. 4:** Intensity values of the wall-pressure fluctuations.
- **Fig. 5a,b.:** Linear coherence spectra between the fluctuations of streamwise velocity in the logarithmic region (both at positions A and F) and wall-pressure.
- **Fig. 7a,b.:** Linear coherence spectra between the fluctuations of wall-normal velocity in the logarithmic region (only at positions A) and wall-pressure.

Before delving into the specific file organization, the reader is reminded hereby of the fundamental parameters of the turbulent flow in the CICLoPE facility, that are reported in Tab. 1 of the manuscript. A description of these parameters can be found in section 2 of the manuscript.

DATA ORGANIZATION

All data are assembled within a single .zip file: **supplementary_material_Dacome_2025.zip**. When opening, several directories are present of which the details are described below.

FIG. 2

Seven files, each containing the probability density functions, normalized by the respective standard deviation (as plotted in Fig. 2); one file per Reynolds number tested.

- **File naming:** `pdf_pressure_reX.mat`, where X is a number from 1 to 7, corresponding to the Reynolds number at which the pdf was computed (see Tab. 1 in the manuscript).
- **File organization:** Two columns: normalized wall-pressure and pdf.

Column 1	Column 2
Normalized wall-pressure, p_w/p'_w (-)	Probability density function, <i>PDF</i> (-)

FIG. 3

Seven files, each containing the pre-multiplied, inner-scaled energy spectra (as plotted in Fig. 3); one file per Reynolds number tested. Data are provided to plot the spectra in the scale-range as shown in Fig. 3.

Therefore, data are provided up to a minimum inner-scaled wavelength of $\lambda_x^+ = 20$ which, in terms of dimensional frequency, changes as a function of Reynolds number.

- **File naming:** `spectra_pressure_reX.mat`, where X is a number from 1 to 7, corresponding to the Reynolds number at which the spectrum was computed (see Tab. 1 in the manuscript).
- **File organization:** Three columns: frequency, inner-scaled wavelength and normalized pre-multiplied inner-scaled wall-pressure spectra.

Column 1	Column 2	Column 3
Frequency, f (Hz)	Inner-scaled wavelength, λ_x^+ (-)	Pre-multiplied inner-scaled spectrum, $k_x^+ \phi_{pp}'$ (-)

FIG. 4

One file containing the intensity values of the wall-pressure fluctuations for each Reynolds number tested.

- **File naming:** `p_prime.txt`.
- **File organization:** Two columns: friction Reynolds number and normalized wall-pressure intensity (as plotted in Fig. 4).

Column 1	Column 2
Friction Reynolds number, Re_τ (-)	Normalized wall-pressure intensity, $p_w'^+$ (-)

FIG. 5

Several files containing the linear coherence spectra between streamwise velocity and wall-pressure fluctuations (as plotted in Fig. 5a,b); several files per Reynolds number tested, as the spectra are provided for considering both the linear and quadratic wall-pressure fluctuations, and for both wall-normal positions (y_A and y_F). A total of 28 files: 7 Reynolds numbers, linear and quadratic wall-pressure, and 2 wall-normal locations.

- **File naming:** `coherence_upG_yP_reX.mat`. Here, G will be a number (either 1 or 2) referring to the power of wall-pressure fluctuations considered (1 for linear, 2 for quadratic); P refers to the wall-normal location (A for y_A and F for y_F); finally, X is a number from 1 to 7, corresponding to the Reynolds number at which the coherence spectrum was computed (see Tab. 1 in the manuscript).
- **File organization:** Two columns: distance-from-the-wall-scaled streamwise wavelength and linear coherence spectrum.

Column 1	Column 2
Distance-from-the-wall-scaled streamwise wavelength, λ_x/y (-)	Linear coherence spectrum, $\gamma_{up_w}^2$ or $\gamma_{up_w^2}^2$ (-)

FIG. 7

Several files containing the linear coherence spectra between wall-normal velocity and wall-pressure fluctuations (as plotted in Fig. 7a,b); several files per Reynolds number tested, as the spectra are provided for considering both the linear and quadratic wall-pressure fluctuations. A total of 14 files: 7 Reynolds numbers, and linear and quadratic wall-pressure.

- **File naming:** `coherence_vpG_reX.mat`. Here, G will be a number (either 1 or 2) referring to the power of wall-pressure fluctuations considered (1 for linear, 2 for quadratic) and X is a number from 1 to 7, corresponding to the Reynolds number at which the coherence spectrum was computed (see Tab. 1 in the manuscript).
- **File organization:** Two columns: distance-from-the-wall-scaled streamwise wavelength and linear coherence spectrum.

Column 1	Column 2
Distance-from-the-wall-scaled streamwise wavelength, λ_x/y (-)	Linear coherence spectrum, $\gamma_{vp_w}^2$ or $\gamma_{vp_w^2}^2$ (-)