

## **Online Resource 1 of “A Unified Assessment of Hydrological and Biogeochemical Responses in Research Watersheds in Eastern Puerto Rico Using Runoff–Concentration Relations.”**

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This file contains runoff rate–concentration graphs of all the data and regressions discussed in this paper. The sequence of figures matches the column sequence in Table 2 of the text, with nonbioactive constituents in a sequence of increasing atmospheric influence, followed by bioactive constituents in a sequence of increasing atmospheric influence, and then particulate organic carbon and total suspended solids. Each figure consists of six panels. Watersheds with granitic bedrock are on the left side, and watersheds with volcanic bedrock are on the right. The agriculturally developed watersheds are in the top row; the forested watersheds are in the bottom two rows. The lower right panel allows visual comparison of all the regressions given in Table 4 of the text.

Each figure has a common set of symbols (not all symbols are shown in every figure). Up-pointing red triangles indicate collection during rising stage, and down-pointing green triangles indicate collection during falling stage. The high-chloride symbol indicates samples with exceptionally high chloride concentrations collected during huge storms; high potassium indicates samples with high potassium but not high chloride; and low silica indicates samples with unusually low silica concentrations for the runoff rate (anomalous constituents in these three groups of samples are not included in regression models). The lines or curves through the data are the regressions given in Table 4. The vertical black lines correspond to the runoff rate below which the indicated percent of the mean annual runoff leaves the watershed.

**Figure 1.** Alkalinity.

**Figure 2.** Silica. The constant-input line in panel C–Icacos and panel E–Guabá refers to a constant base flow supply of silica with no other sources.

**Figure 3.** Calcium.

**Figure 4.** Magnesium.

**Figure 5.** Sodium.

**Figure 6.** Chloride.

**Figure 7.** Potassium. The constant-input line in panel E–Guabá refers to possible constant supply of dissolved potassium at highest runoff rates.

**Figure 8.** Sulfate.

**Figure 9.** Nitrate. The constant-input line in panel A–Cayaguás and panel B–Canóvanas refers to possible constant supply of dissolved nitrate at highest runoff rates.

**Figure 10.** Ammonium ion.

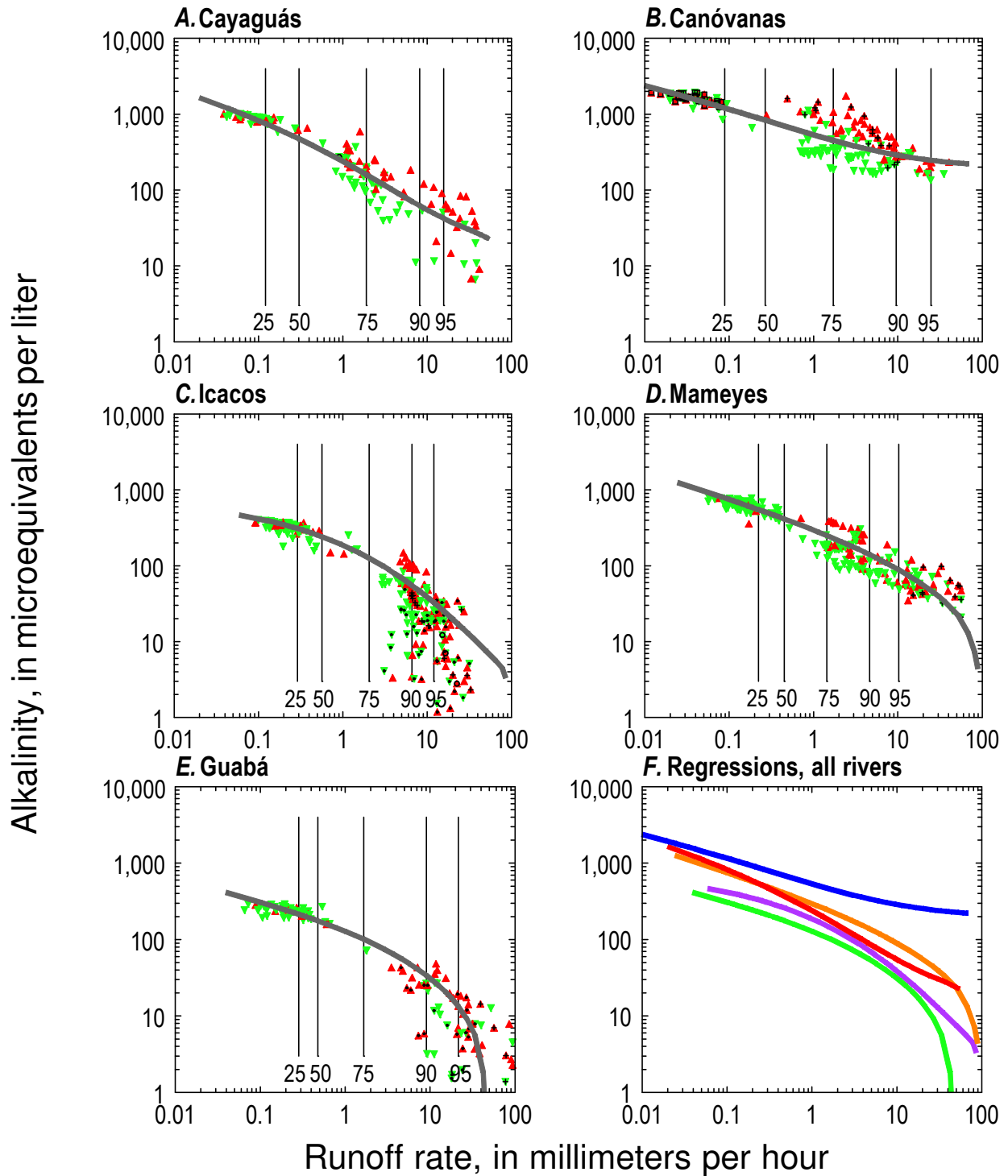
**Figure 11.** Phosphate. The constant-input line in panel B–Canóvanas refers to possible constant supply of dissolved phosphate at highest runoff rates.

**Figure 12.** Dissolved organic carbon (DOC). The constant-input line in panel C–Icacos and panel E–Guabá refers to possible constant supply of DOC at highest runoff rates.

**Figure 13.** Particulate organic carbon.

**Figure 14.** Total suspended solids.

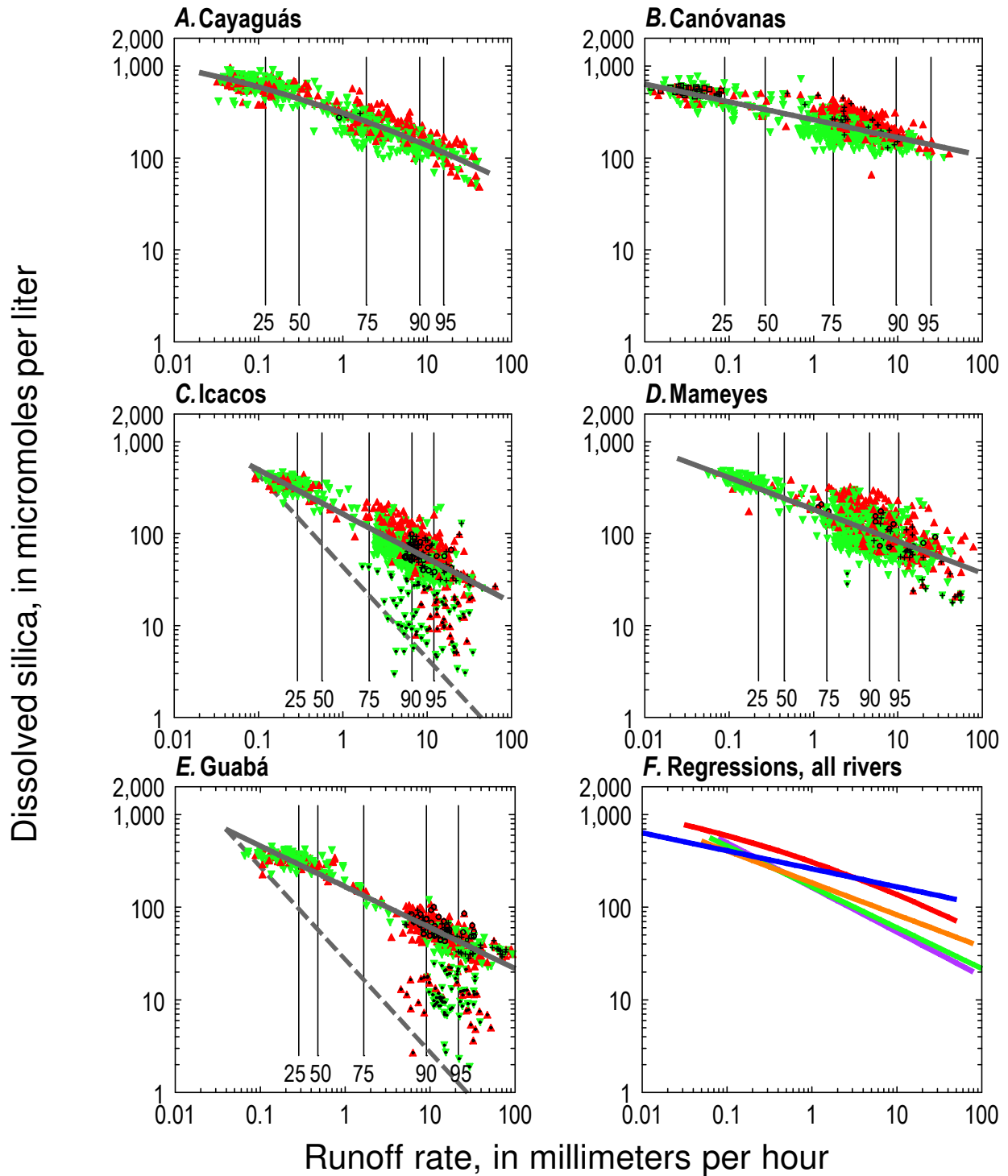
Figure 1, Stallard and Murphy — Alkalinity



**EXPLANATION**

- |       |                   |   |           |   |                |
|-------|-------------------|---|-----------|---|----------------|
|       | Runoff percentile | — | Canóvanas | ▲ | Rising stage   |
| —     | Regression        | — | Cayaguás  | ▼ | Falling stage  |
| - - - | Constant input    | — | Mameyes   | + | High chloride  |
|       |                   | — | Icacos    | o | High potassium |
|       |                   | — | Guabá     | • | Low silica     |
|       |                   |   |           | □ | Calcite        |

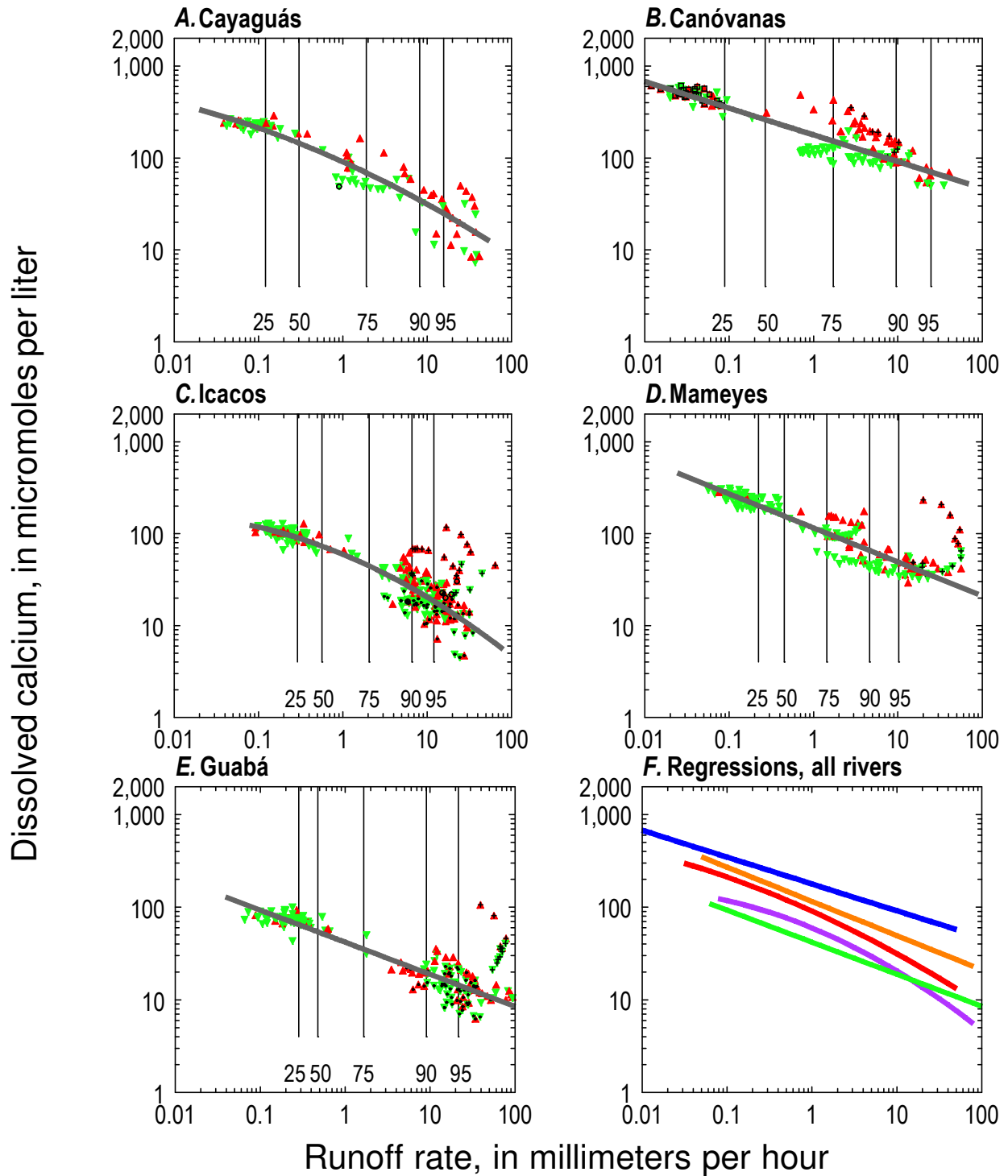
Figure 2, Stallard and Murphy — Silica



**EXPLANATION**

- |       |                   |   |           |   |                |
|-------|-------------------|---|-----------|---|----------------|
|       | Runoff percentile | — | Canóvanas | ▲ | Rising stage   |
| —     | Regression        | — | Cayaguás  | ▼ | Falling stage  |
| - - - | Constant input    | — | Mameyes   | + | High chloride  |
|       |                   | — | Icacos    | ○ | High potassium |
|       |                   | — | Guabá     | • | Low silica     |
|       |                   |   |           | ◻ | Calcite        |

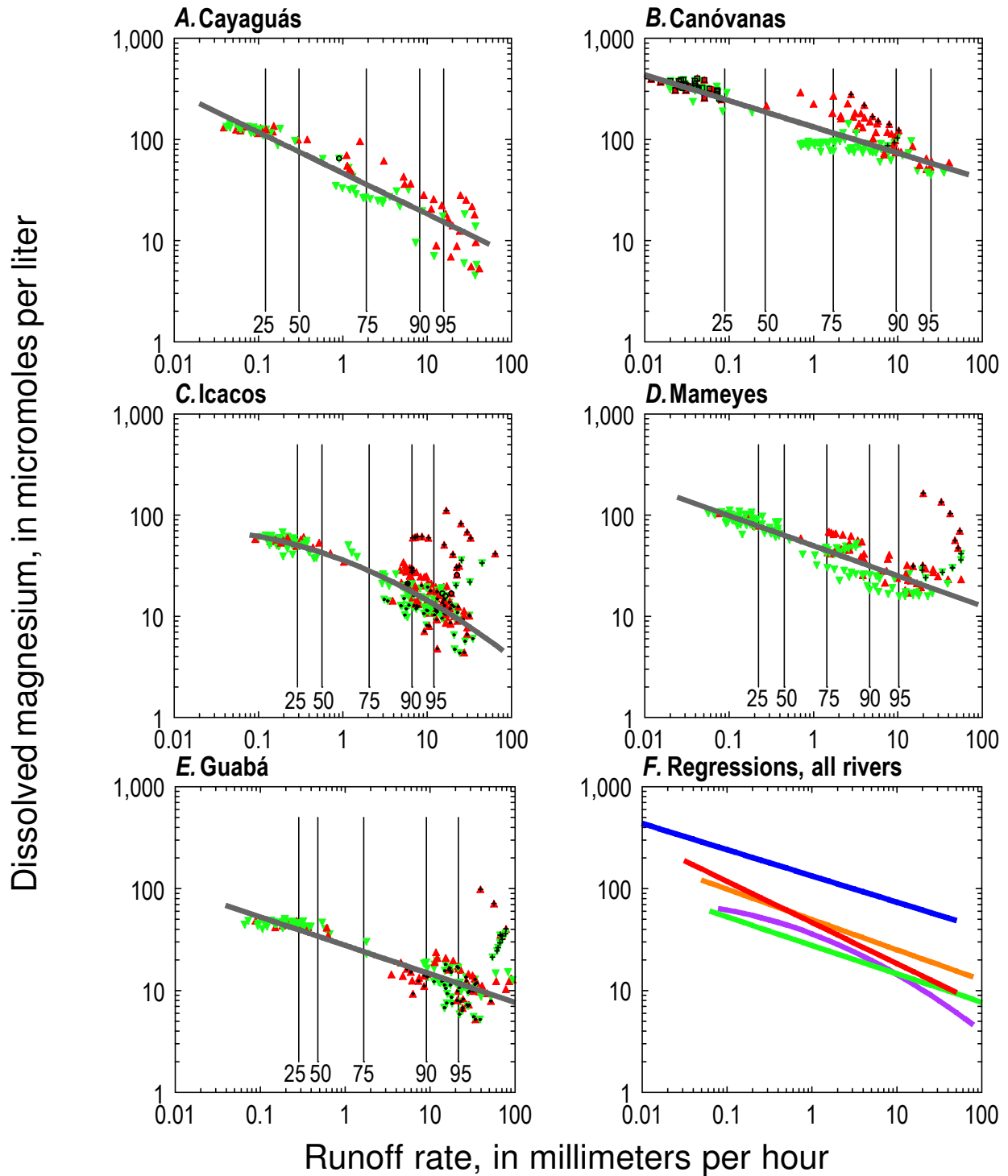
Figure 3, Stallard and Murphy — Calcium



**EXPLANATION**

- |     |                   |   |           |   |                |
|-----|-------------------|---|-----------|---|----------------|
|     | Runoff percentile | — | Canóvanas | ▲ | Rising stage   |
| —   | Regression        | — | Cayaguás  | ▼ | Falling stage  |
| --- | Constant input    | — | Mameyes   | + | High chloride  |
|     |                   | — | Icacos    | o | High potassium |
|     |                   | — | Guabá     | • | Low silica     |
|     |                   | □ |           |   | Calcite        |

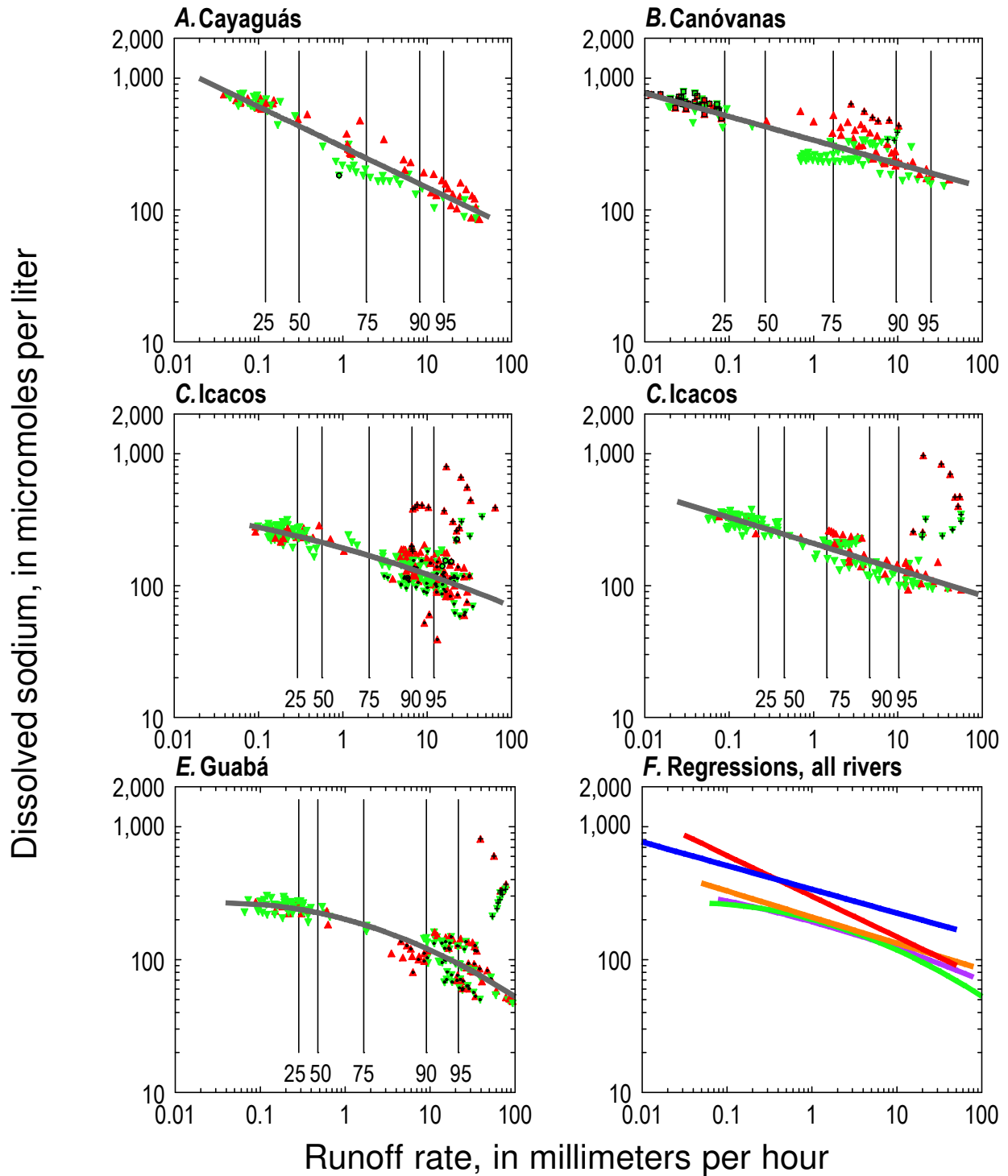
Figure 4, Stallard and Murphy — Magnesium



**EXPLANATION**

- |       |                   |   |           |   |                |
|-------|-------------------|---|-----------|---|----------------|
|       | Runoff percentile | — | Canóvanas | ▲ | Rising stage   |
| —     | Regression        | — | Cayaguás  | ▼ | Falling stage  |
| - - - | Constant input    | — | Mameyes   | + | High chloride  |
|       |                   | — | Icacos    | o | High potassium |
|       |                   | — | Guabá     | • | Low silica     |
|       |                   |   |           | □ | Calcite        |

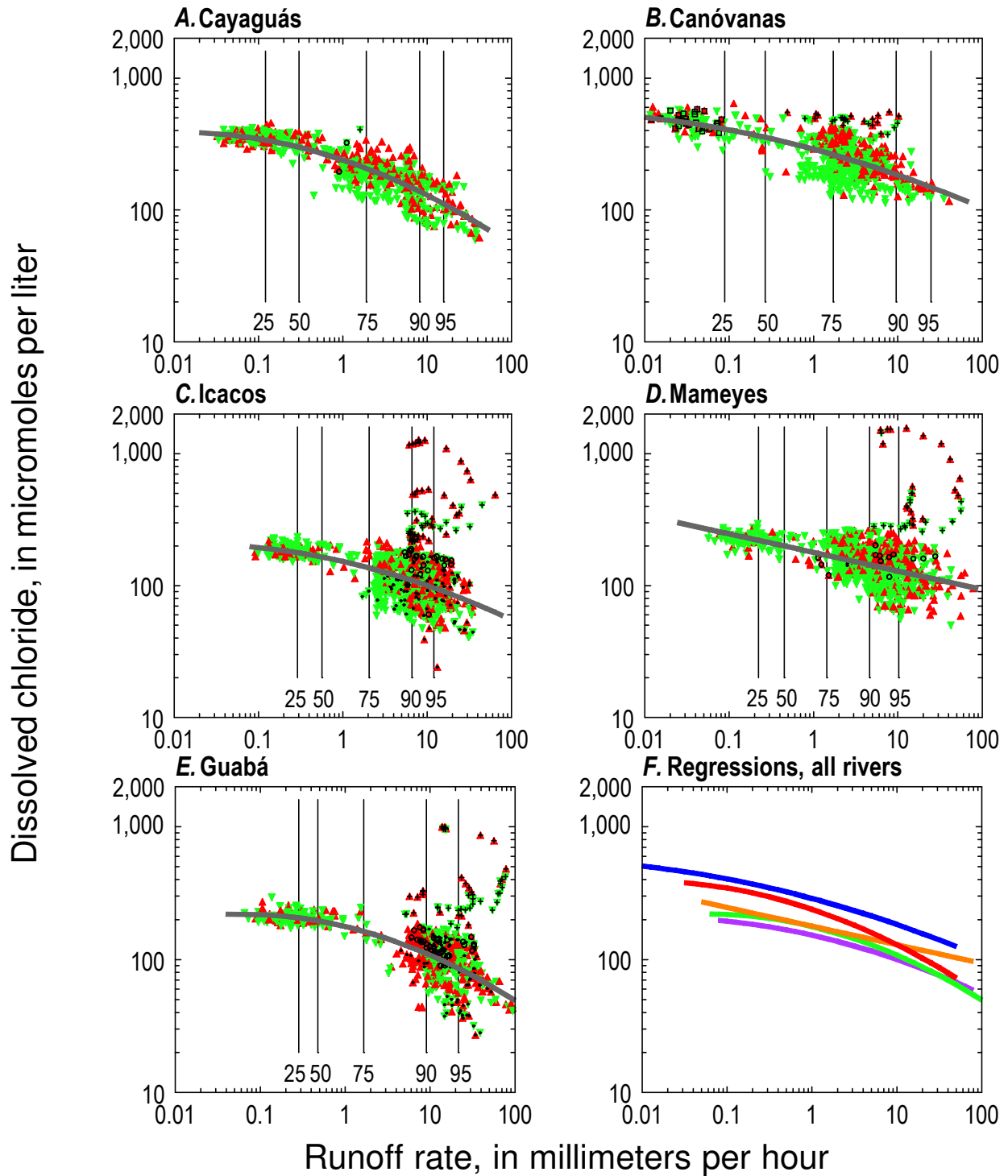
Figure 5, Stallard and Murphy — Sodium



**EXPLANATION**

- |       |                   |   |           |   |                |
|-------|-------------------|---|-----------|---|----------------|
|       | Runoff percentile | — | Canóvanas | ▲ | Rising stage   |
| —     | Regression        | — | Cayaguás  | ▼ | Falling stage  |
| - - - | Constant input    | — | Mameyes   | + | High chloride  |
|       |                   | — | Icacos    | o | High potassium |
|       |                   | — | Guabá     | • | Low silica     |
|       |                   | □ |           |   | Calcite        |

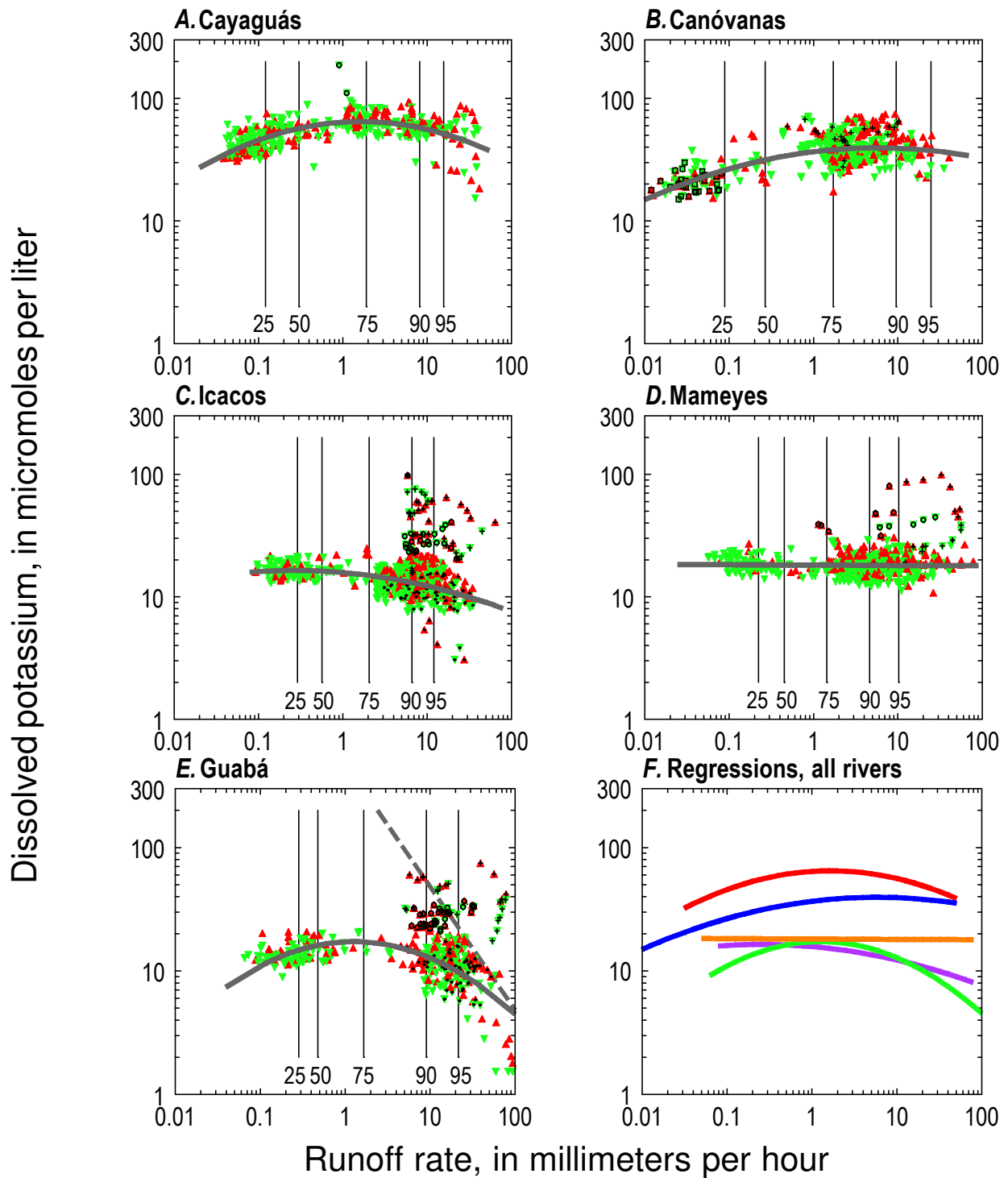
Figure 6, Stallard and Murphy — Chloride



**EXPLANATION**

- |       |                   |   |           |   |                |
|-------|-------------------|---|-----------|---|----------------|
|       | Runoff percentile | — | Canóvanas | ▲ | Rising stage   |
| —     | Regression        | — | Cayaguás  | ▼ | Falling stage  |
| - - - | Constant input    | — | Mameyes   | + | High chloride  |
|       |                   | — | Icacos    | ○ | High potassium |
|       |                   | — | Guabá     | • | Low silica     |
|       |                   | — |           | ◻ | Calcite        |

Figure 7, Stallard and Murphy — Potassium

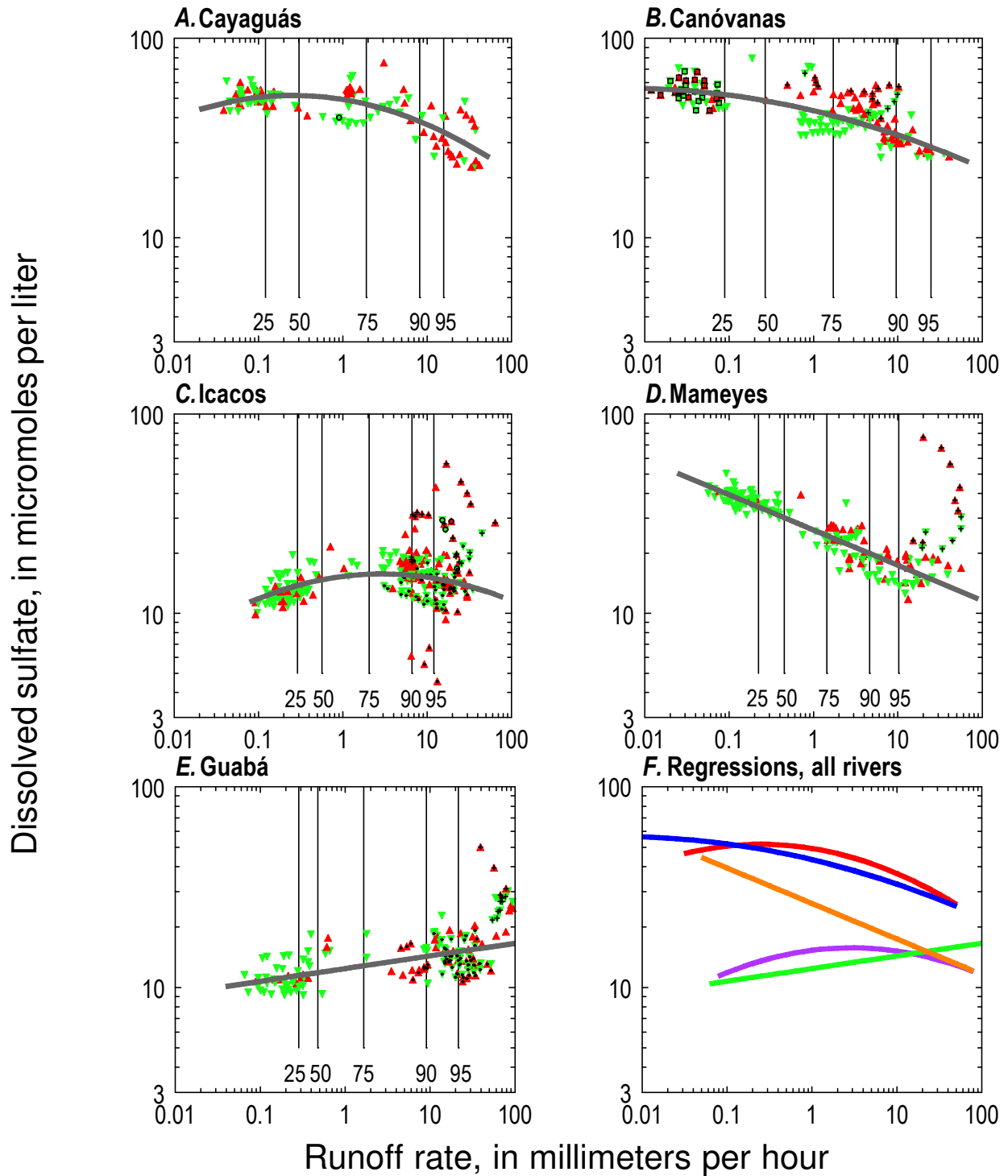


**EXPLANATION**

- |       |                   |   |           |   |                |
|-------|-------------------|---|-----------|---|----------------|
|       | Runoff percentile | — | Canóvanas | ▲ | Rising stage   |
| —     | Regression        | — | Cayaguás  | ▼ | Falling stage  |
| - - - | Constant input    | — | Mameyes   | + | High chloride  |
|       |                   | — | Icacos    | o | High potassium |
|       |                   | — | Guabá     | • | Low silica     |
|       |                   |   |           | ◻ | Calcite        |



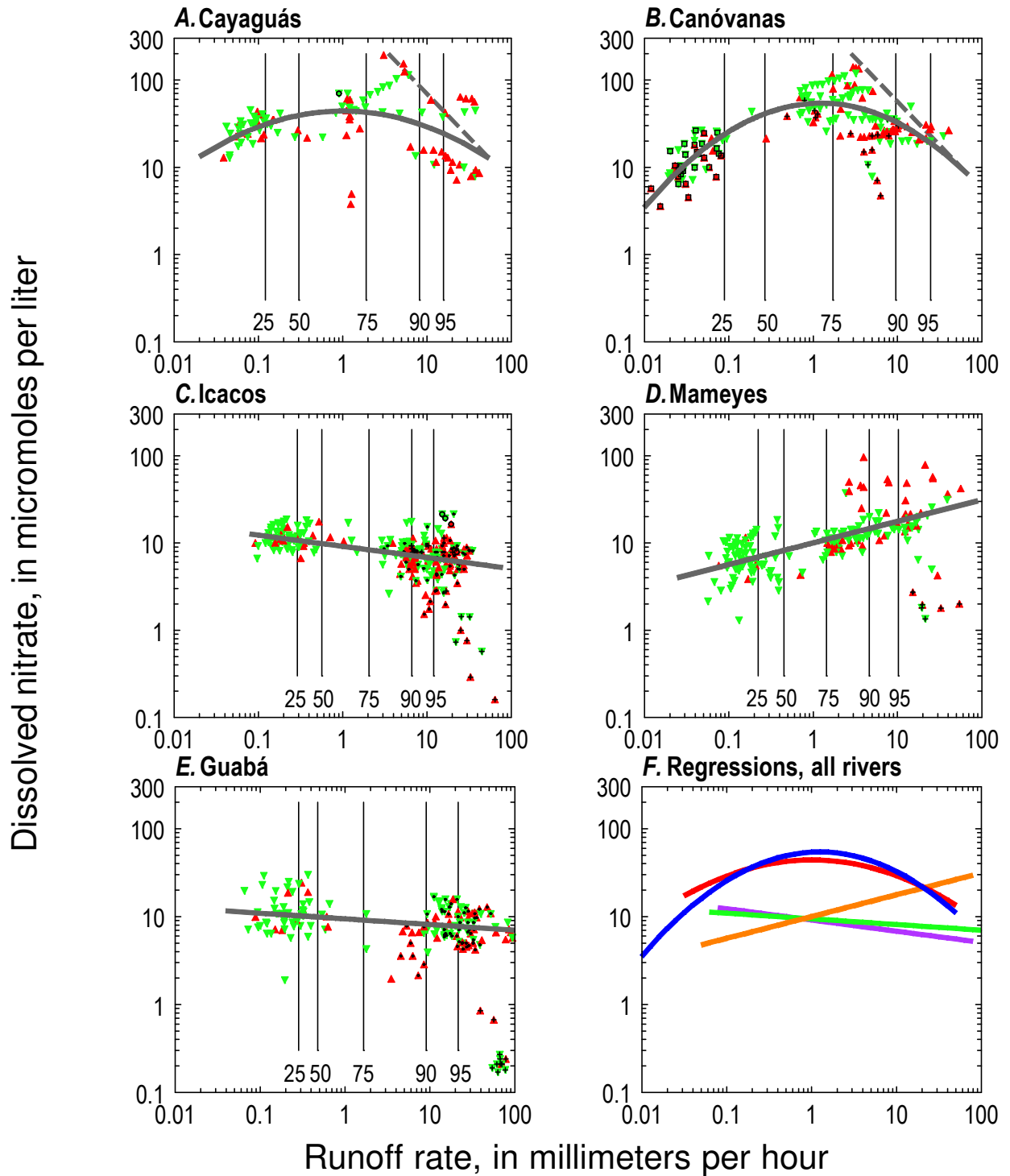
Figure 8, Stallard and Murphy — Sulfate



**EXPLANATION**

- |     |                   |   |           |   |                |
|-----|-------------------|---|-----------|---|----------------|
|     | Runoff percentile | — | Canóvanas | ▲ | Rising stage   |
| —   | Regression        | — | Cayaguás  | ▼ | Falling stage  |
| --- | Constant input    | — | Mameyes   | + | High chloride  |
|     |                   | — | Icacos    | o | High potassium |
|     |                   | — | Guabá     | • | Low silica     |
|     |                   | — |           | ◻ | Calcite        |

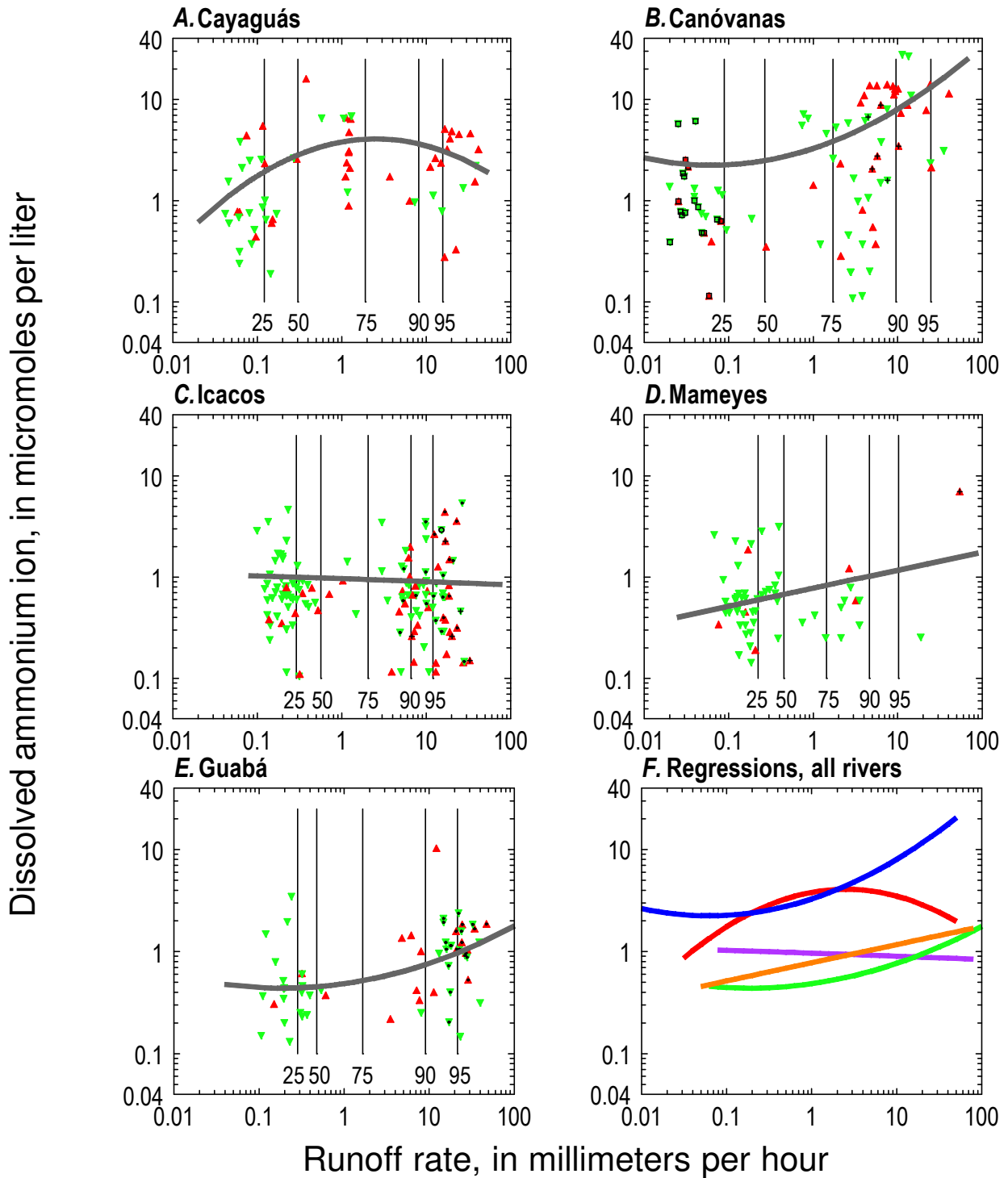
Figure 9, Stallard and Murphy — Nitrate



**EXPLANATION**

- |     |                   |   |           |   |                |
|-----|-------------------|---|-----------|---|----------------|
|     | Runoff percentile | — | Canóvanas | ▲ | Rising stage   |
| —   | Regression        | — | —         | ▼ | Falling stage  |
| --- | Constant input    | — | —         | + | High chloride  |
|     |                   | — | —         | ○ | High potassium |
|     |                   | — | —         | • | Low silica     |
|     |                   | — | —         | ◻ | Calcite        |

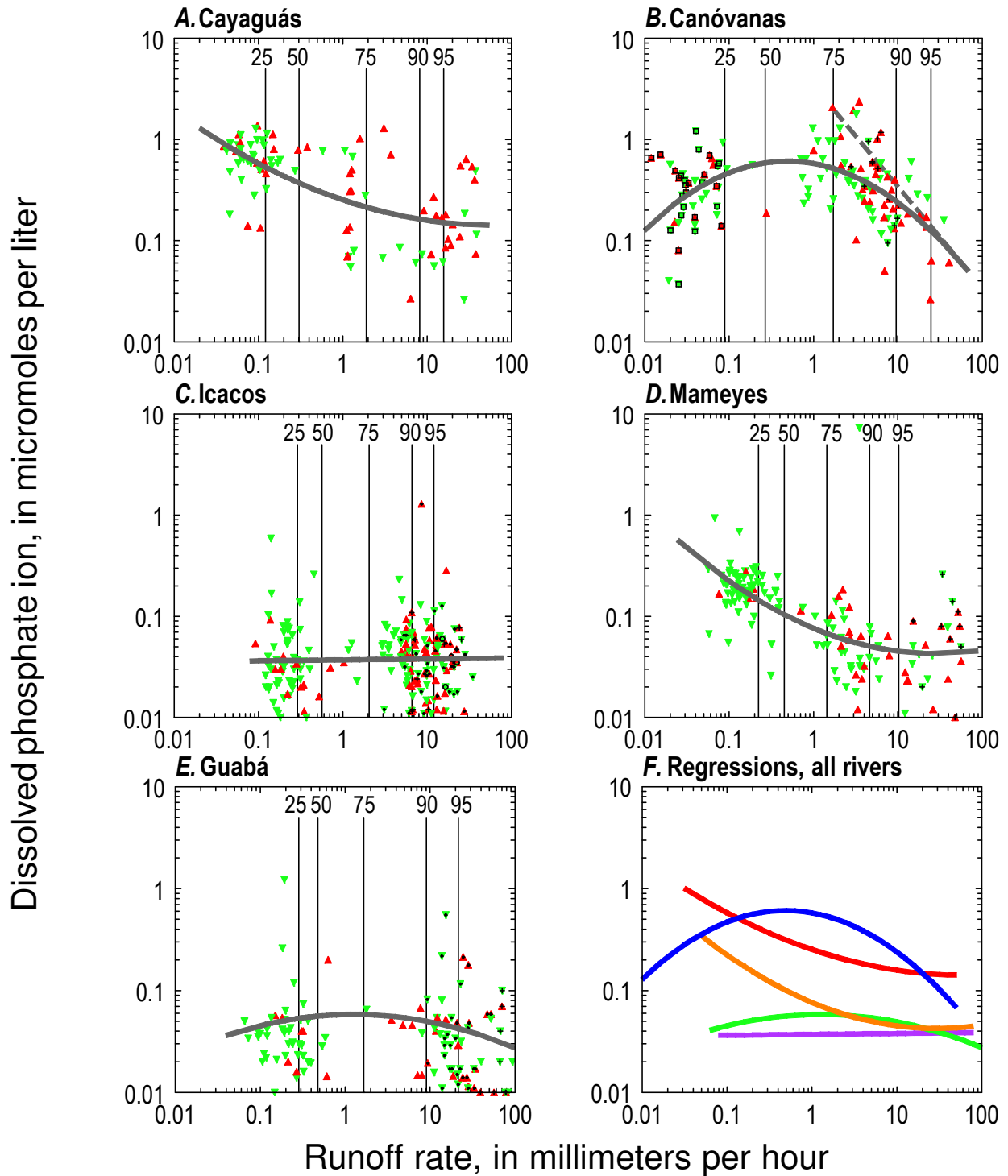
Figure 10, Stallard and Murphy — Ammonium



**EXPLANATION**

- |       |                   |   |           |   |                |
|-------|-------------------|---|-----------|---|----------------|
|       | Runoff percentile | — | Canóvanas | ▲ | Rising stage   |
| —     | Regression        | — | Cayaguás  | ▼ | Falling stage  |
| - - - | Constant input    | — | Mameyes   | + | High chloride  |
|       |                   | — | Icacos    | o | High potassium |
|       |                   | — | Guabá     | • | Low silica     |
|       |                   | — |           | ◻ | Calcite        |

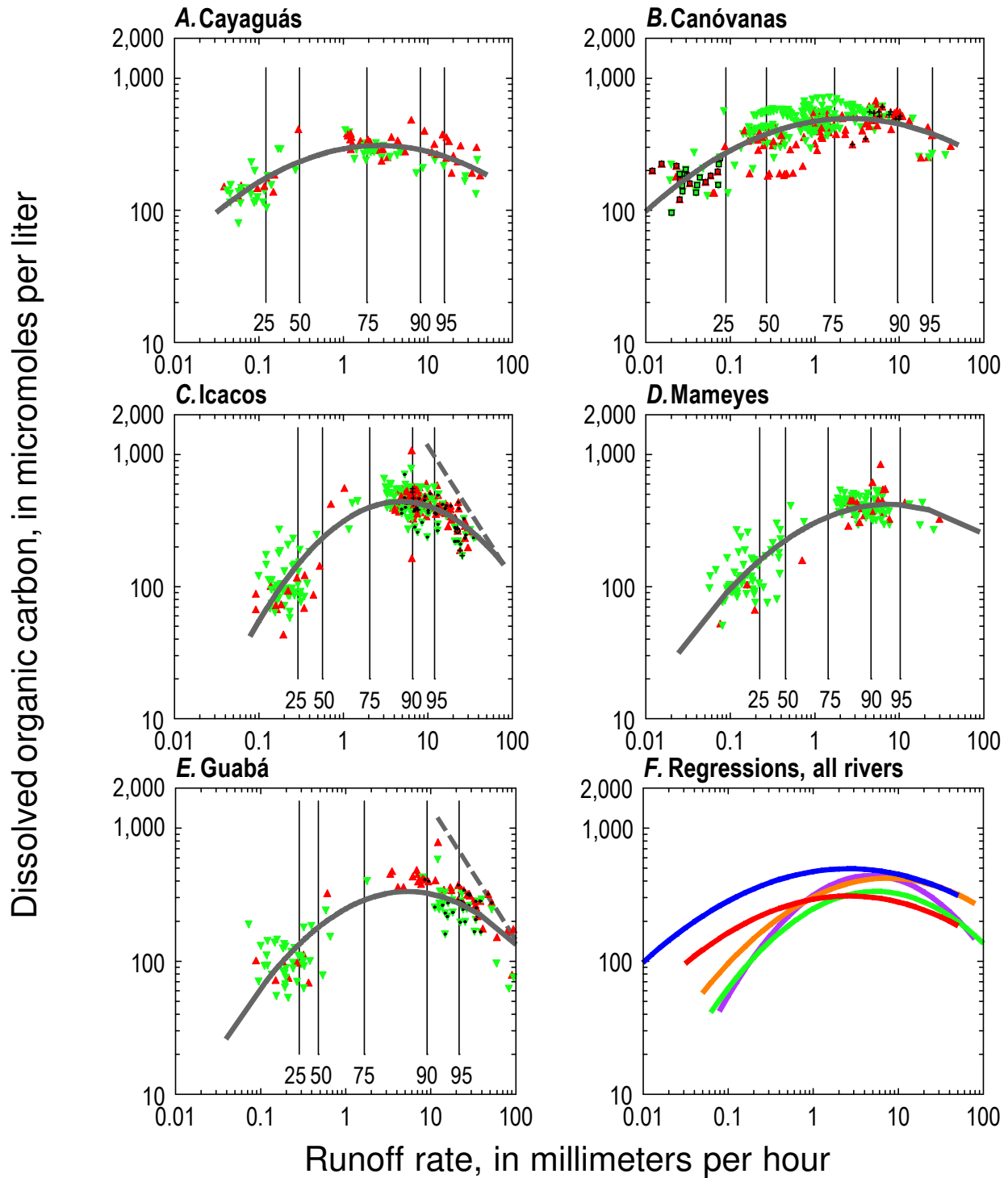
Figure 11, Stallard and Murphy — Phosphate



**EXPLANATION**

- |       |                   |   |           |   |                |
|-------|-------------------|---|-----------|---|----------------|
|       | Runoff percentile | — | Canóvanas | ▲ | Rising stage   |
| —     | Regression        | — | Cayaguás  | ▼ | Falling stage  |
| - - - | Constant input    | — | Mameyes   | + | High chloride  |
|       |                   | — | Icacos    | ○ | High potassium |
|       |                   | — | Guabá     | • | Low silica     |
|       |                   |   |           | ◻ | Calcite        |

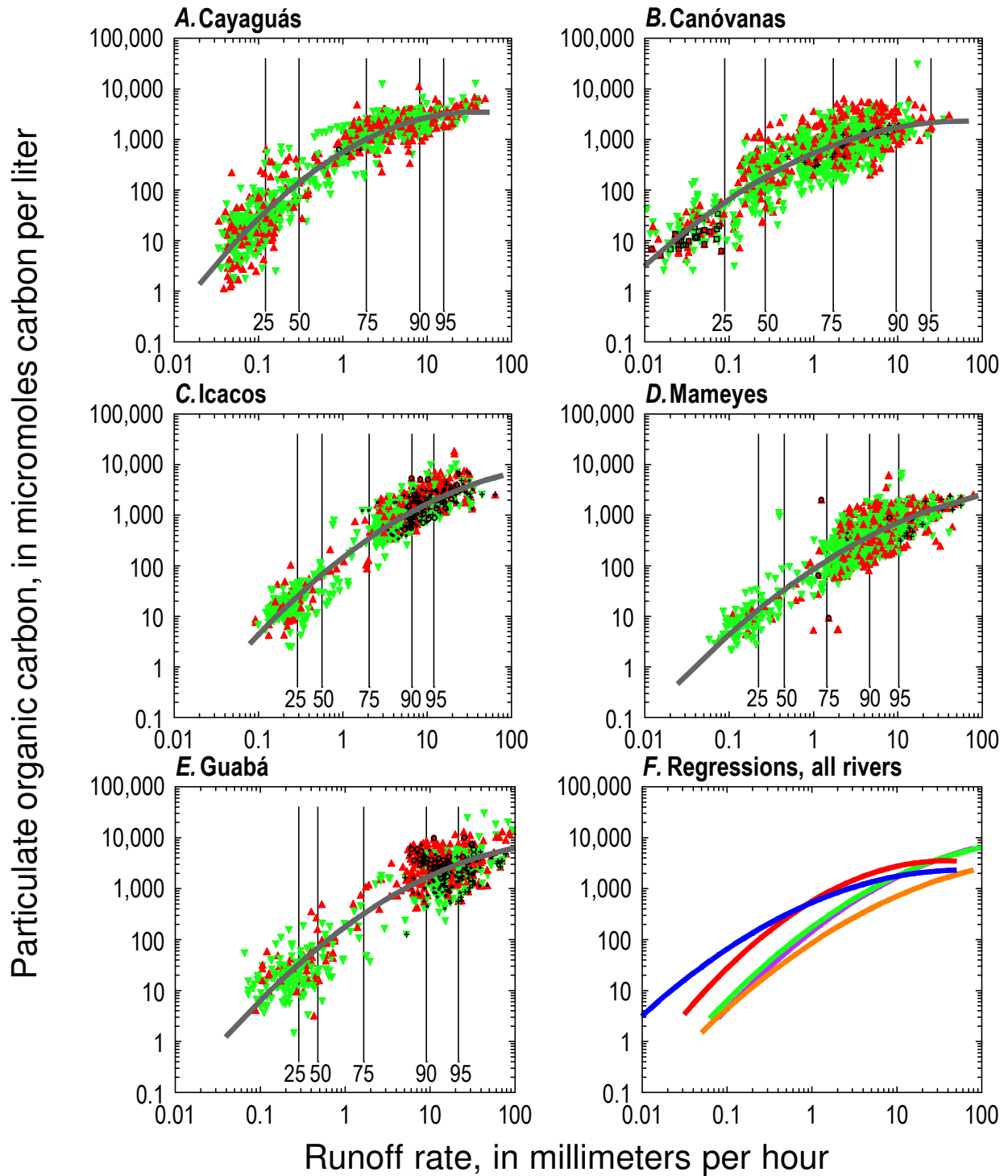
Figure 12, Stallard and Murphy — dissolved organic carbon



**EXPLANATION**

- |       |                   |   |           |   |                |
|-------|-------------------|---|-----------|---|----------------|
|       | Runoff percentile | — | Canóvanas | ▲ | Rising stage   |
| —     | Regression        | — | Cayaguás  | ▼ | Falling stage  |
| - - - | Constant input    | — | Mameyes   | + | High chloride  |
|       |                   | — | Icacos    | o | High potassium |
|       |                   | — | Guabá     | • | Low silica     |
|       |                   |   |           | ◻ | Calcite        |

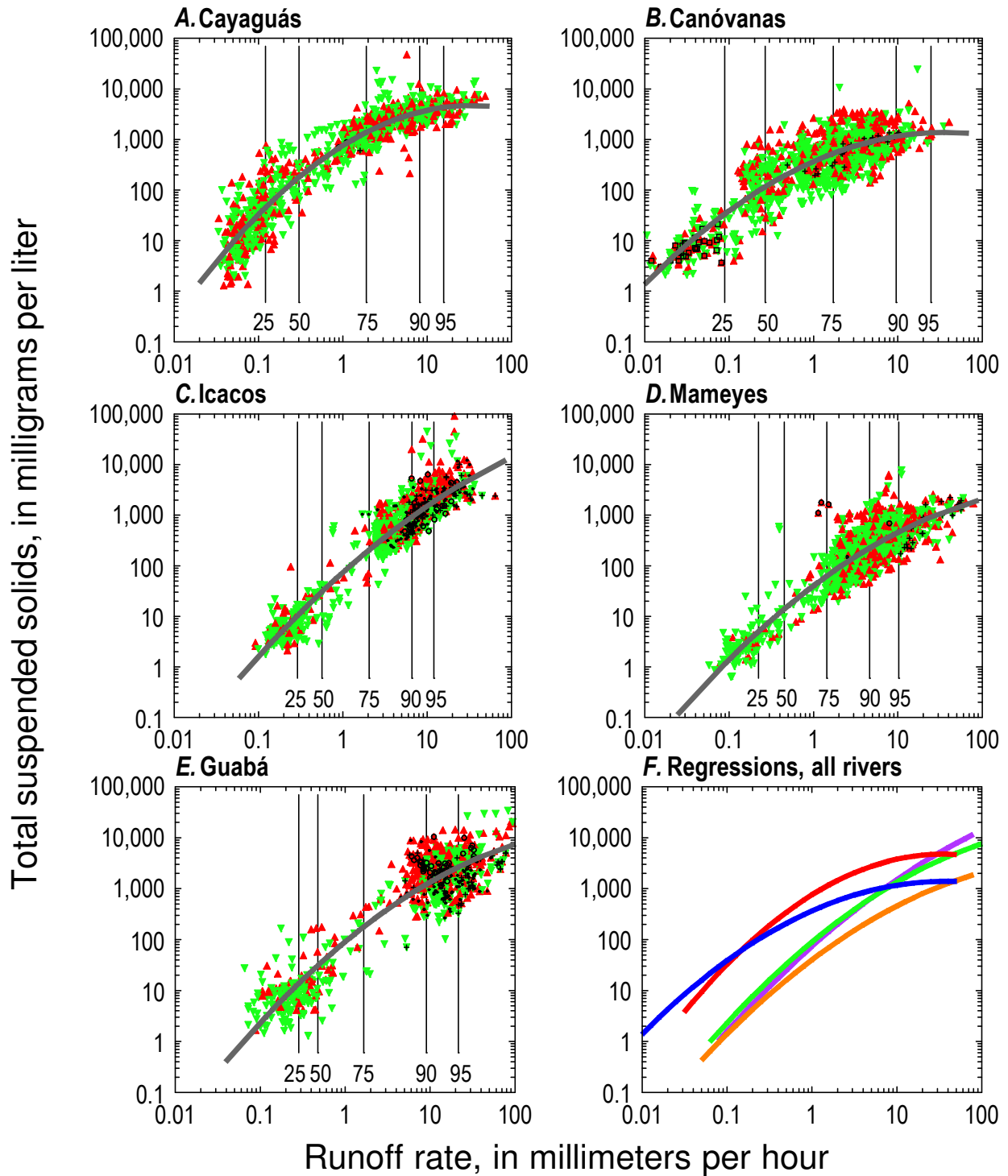
Figure 13, Stallard and Murphy — Particulate organic carbon



**EXPLANATION**

- |     |                   |   |           |   |                |
|-----|-------------------|---|-----------|---|----------------|
|     | Runoff percentile | — | Canóvanas | ▲ | Rising stage   |
| —   | Regression        | — | —         | ▼ | Falling stage  |
| --- | Constant input    | — | —         | + | High chloride  |
|     |                   | — | —         | o | High potassium |
|     |                   | — | —         | • | Low silica     |
|     |                   | — | —         | ◻ | Calcite        |

Figure 14, Stallard and Murphy — Total suspended solids



**EXPLANATION**

- |     |                   |   |           |   |                |
|-----|-------------------|---|-----------|---|----------------|
|     | Runoff percentile | — | Canóvanas | ▲ | Rising stage   |
| —   | Regression        | — | —         | ▼ | Falling stage  |
| --- | Constant input    | — | —         | + | High chloride  |
|     |                   | — | —         | o | High potassium |
|     |                   | — | —         | • | Low silica     |
|     |                   | — | —         | ◻ | Calcite        |