specific humidities of the lifted and original layers. These specific humidities are approximated by the mixing ratios associated with the saturation adiabat for the 1 000-hPa dewpoint.

As further illustrated in Figure 2.5, the moisture inflow behind the barrier is given by:

$$I_1 = \frac{q_1 \# V_1 \# \Delta p_1}{g} \tag{2.2}$$

where $I_1$ is the moisture inflow; $q_1$ is the specific humidity; $V$ is the wind velocity; $\Delta p_1$ is the depth of the layer in hPa; g is the acceleration of gravity in cm/s$^2$.The flow over the barrier is given by:

$$I_2 = \frac{q_2 \# V_2 \# \Delta p_2}{g} \tag{2.3}$$

Applying the relationship $V_1 \Delta p_1 = V_2 \Delta p_2$ and the principle of continuity of mass to these equations shows how the moisture inflow $I_2$ is reduced by the ratio of specific humidities:

$$I_2 = I_1 \# \frac{q_2}{q_1} \tag{2.4}$$

For the example storm being considered, mixing ratio values from table A.1.4 are used to approximate the specific humidity values and the moisture maximizing ratio can be determined as:

$$W_m = 74.3 \# \frac{17.7}{19.1} = 68.9$$

$$W_s = 57.1 \# \frac{14.5}{15.9} = 52.1$$

$$r_m = 1.32$$

In this example, the moisture maximizing ratio remains unchanged. This alternative procedure can result in different results when storm transposition is involved (see section 2.5).

Whenever possible, however, representative storm dewpoints on the leeward side of the barrier should be used. This is especially advisable in the case of local storms, which do not necessarily require a strong, widespread moisture inflow, but may utilize moisture that has seeped into and accumulated in the storm area during an interval of several days or longer of sluggish circulation prior to the storm (section 5.3.7).

## 2.4 WIND MAXIMIZATION

### 2.4.1 Introduction

Wind maximization is most commonly used in orographic regions when it appears that observed storm rainfall over a mountain range might vary in proportion to the speed of the moisture-bearing wind blowing against the range. Wind maximization in such regions is discussed in sections 3.3.1.1 and 3.3.1.2.

In non-orographic regions, wind maximization is used infrequently. For these regions, storms can be transposed hundreds of kilometres to synthesize an adequate storm history for a project basin. It is reasoned that moisture inflow rates recorded in extreme storms are at a maximum or near-maximum for precipitation-producing effectiveness, and there is generally no need to maximize wind speeds.

This reasoning follows from the logical assumption that storms with the highest wind speeds do not necessarily produce the most intense precipitation. While hurricanes or typhoons do have high wind speeds and tend to produce heavier rainfall, their moisture content is also much higher. Whether hurricanes with the highest wind speeds produce more rainfall than weaker hurricanes is uncertain, since they generally reach full strength over water. It is known, however, that rainfall from hurricanes over land is not proportional to their wind speeds.

### 2.4.2 Use in non-orographic regions

Wind maximization is occasionally used in non-orographic regions when moisture adjustments alone appear to yield inadequate or unrealistic results.

In regions with limited hydrometeorological data, for example, wind maximization may be used to partly compensate for a short period of record, or when a storm sample may be inadequate due to limitations on storm transpositions. This is because

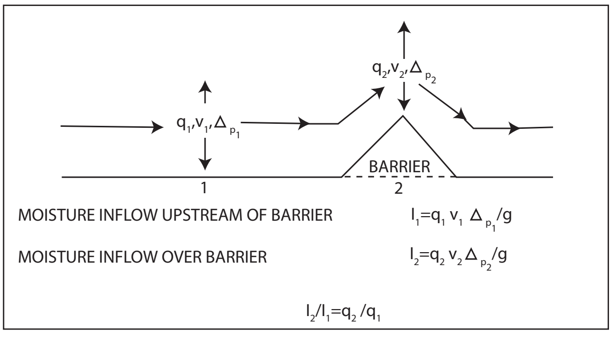


**Figure 2.5. Schematic illustrating concept for alternative moisture adjustment for intervening barrier to air flow (after Hart, 1982)**