Reference
Input

R

$+$

$R \mp B$

$+/-$

B Primary
Feedback
Signal

Controlled Element
G

Forward Path

Feedback Element
H

Feedback Path

Controlled
Output

C

Figure 13.1 Basic block diagram including feedback elements. Negative feedback means that the summing point is a subtractor, i.e., $R - B$. Positive feedback means that the summing point is an adder, i.e., $R + B$.
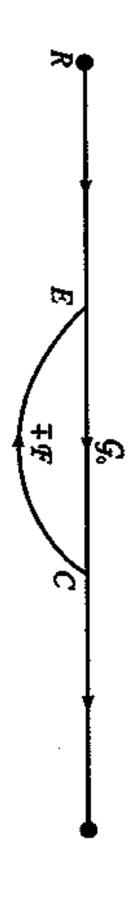
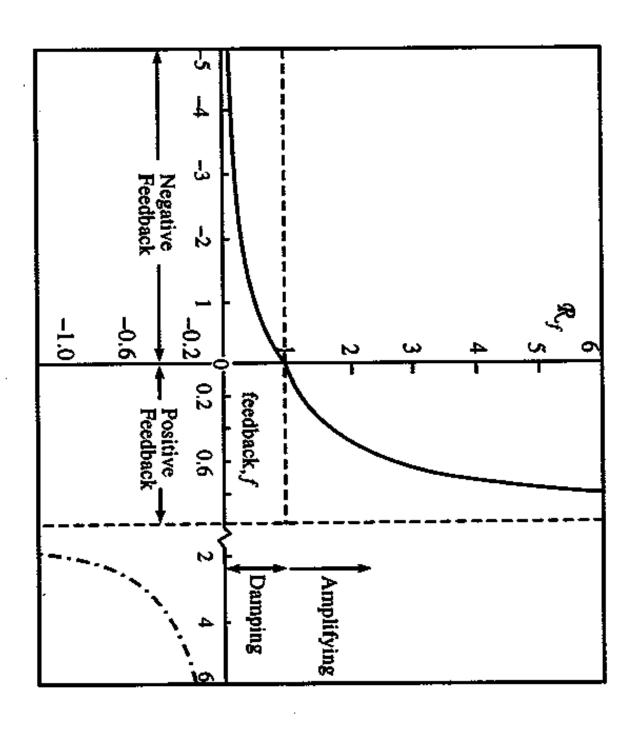Figure 13.2 Signal flow graph for the system described in Figure 13.1

Figure 13.3 Feedback gain ratio versus feedback. (From Schlesinger, 1986.)
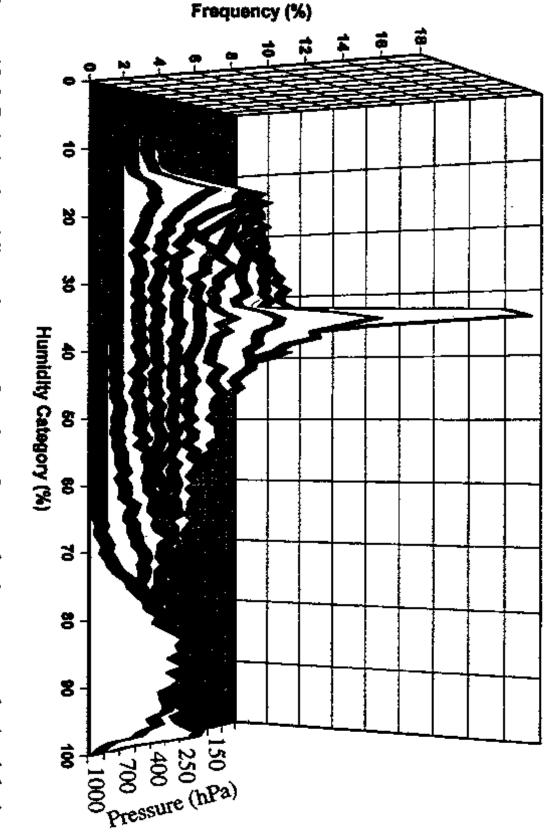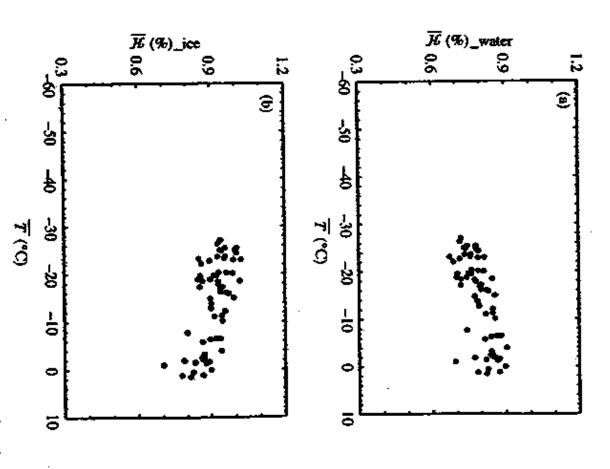
Figure 13.4 Relative humidity values as a function of atmospheric pressure obtained during 1,600 radiosonde ascents in the tropical western Pacific during January–May of 1994 and 1995. (From Spencer and Braswell, 1997.)

Figure 13.5 Monthly averaged values of relative humidity over the Arctic Ocean (a) with respect to liquid water and (b) with respect to ice. Humidity values are averaged over the 500- to 300-hPa layer and plotted against mean monthly temperature. (From Curry *et al.*, 1995.)
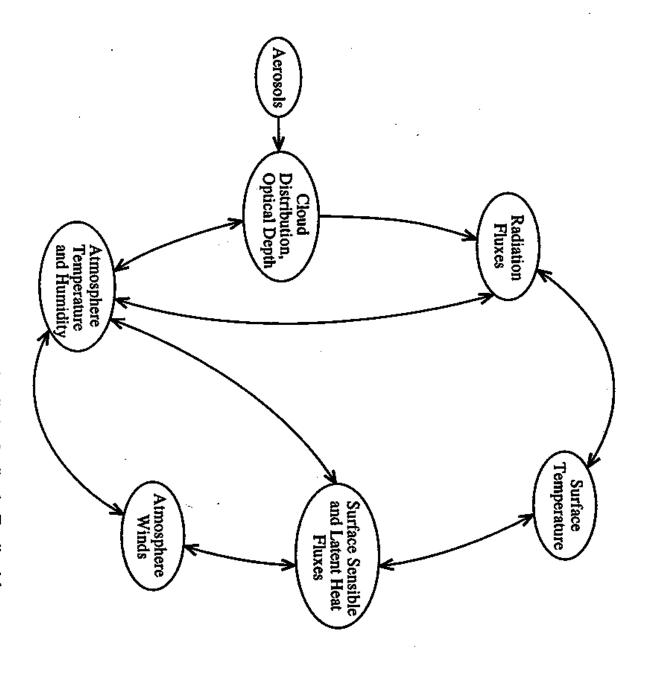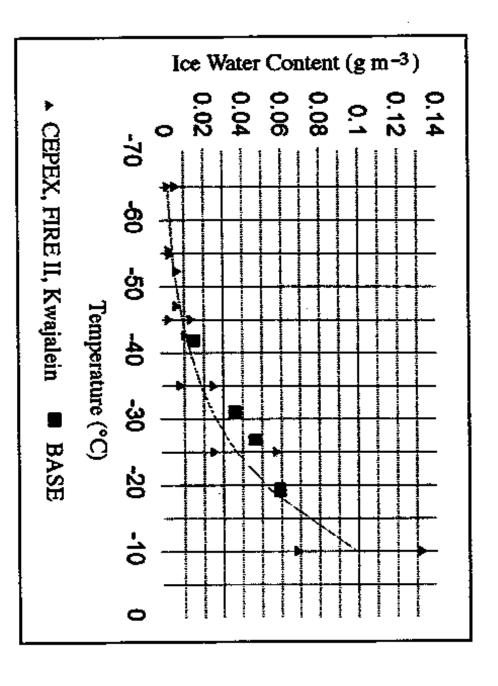
Figure 13.6 Signal flow graph illustrating the cloud-radiation feedback. Feedback loops may be positive or negative, depending on the atmospheric state and the horizontal scale under consideration. (After Curry *et al.*, 1996.)

Table 13.1. Estimates of the mean annual, globally averaged cloud-radiative effect (W m^{-2}) at the top of the atmosphere derived from satellite observations and general circulation models.

Basis	Investigation	CF^{LW}	CF^{SW}	CF^{net}
Satellite	Ramanathan et al. (1989)	31	-48	-17
Satellite,	Ardanuy et al. (1991)	24	-51	-27
Models	Cess and Potter (1987)	23 to 55	-45 to -75	-2 to -34

Figure 13.7 Observed relationship between cirrus ice water content and cloud temperature, obtained from research aircraft flights during CEPEX (tropics), FIRE II (mid-latitudes), and BASE (Arctic). (Courtesy of J. Intrieri.)
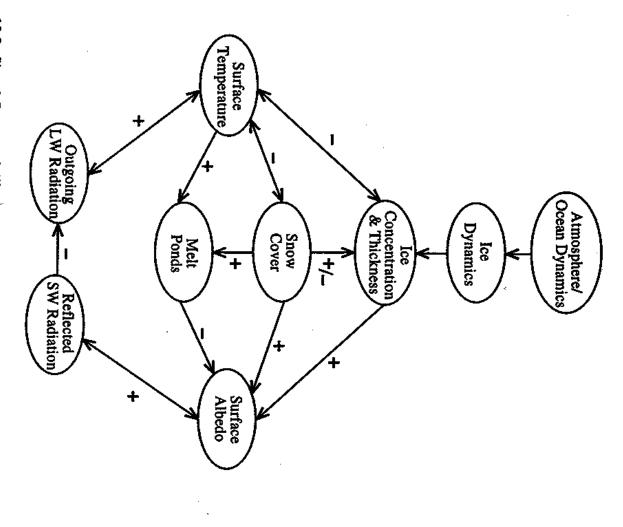
Figure 13.8 Signal flow graph illustrating the sea-ice-albedo feedback mechanism locally over the ice pack. In this context, large-scale atmospheric and oceanic circulations are regarding as external forcing. Note that ice concentration includes both large-scale sea ice extent and small-scale features such as leads. (After Curry *et al.*, 1996.)

Table 13.2 Magnitude and/or sign of the terms in (13.41).

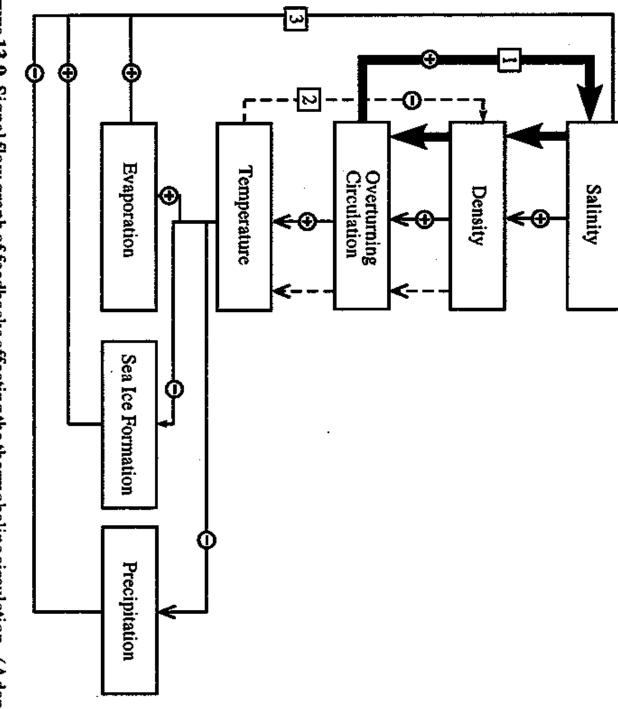| Ice type	Summertime albedo	dA/dT_0
Bare ice	0.56	< 0
Open water	0.10	> 0
Melt ponds	0.25	< 0
Snow	0.77	< 0

Figure 13.9 Signal flow graph of feedbacks affecting the thermohaline circulation. (Adapted from Willebrand, 1993.)