MODIS Band/Wavelength Characteristics

Band Number	Wavelength (µm)	Used in Cloud Mask
1	0.659	Thick clouds over dark surface; veg index (with 0.86 µm)
2	0.865	Low clouds; veg index (with 0.66 µm)
3	0.470	
4	0.555	
5	1.240	Cloud particle size (with 2.1 µm)
6	1.640	Snow, clouds over snow (with 0.55 µm)
7	2.130	Cloud particle size (w 1.2 um)
17	0.905	
18	0.936	
19	0.940	
26	1.375	Thin cirrus
20	3.750	Low clouds, fires
22	3.959	
23	4.050	
24	4.465	
25	4.515	
27	6.715	Upper tropospheric moisture, high cloud
28	7.325	Mid tropospheric moisture
29	8.550	Window channel, cloud phase (with 11 µm)
30	9.730	Ozone
31	11.030	Window channel, cloud phase (with 8 µm)
32	12.020	Dirty window, low moisture (TPW with 11 µm)
33	13.335	Cloud height
34	13.635	Cloud height
35	13.935	High cloud detection, cloud height
36	14.235	Cloud height

Scene	Solar/Reflectance	Thermal	Comments
Low cloud over water	$R_{0.86}$, $R_{0.67}/R_{0.87}$, $BT_{11}-BT_{3.7}$	Difficult, compare BT_{11} to daytime mean clear-sky values of BT_{11}; BT_{11} in combination with brightness temperature difference tests; Over oceans, expect a relationship between $BT_{11}-BT_{8.6}$, $BT_{11}-BT_{12}$ due to water vapor amount being correlated to SST	Spatial and temporal uniformity tests sometimes used of water scenes; Beware of Sun-glint regions
High Thick cloud over water	$R_{1.38}$, $R_{0.86}$, $R_{0.67}/R_{0.87}$,	BT_{11} ; $BT_{13.6}$; $BT_{6.7}$ $BT_{11}-BT_{8.6}$, $BT_{11}-BT_{12}$	
High Thin cloud over water	$R_{1.38}$	$BT_{6.7}$; $BT_{13.9}$ $BT_{11}-BT_{12}$, $BT_{3.7}-BT_{12}$	For $R_{1.38}$, Be careful of surface reflectance for atmospheres with low total water vapor amounts. For BT difference tests, beware of variations in surface emissivity.
Low cloud over snow	$(R_{0.65} - R_{1.6}) / (R_{0.65} + R_{1.6})$; $BT_{11}-BT_{3.7}$	Difficult, look for inversions	Ratio test is called, NDSI (Normalized Difference Snow Index). $R_{2.1}$ is also dark over snow and bright for low cloud.
High thick cloud over snow	$R_{1.38}$; $(R_{0.65} - R_{1.6}) / (R_{0.65} + R_{1.6})$;	BT_{11} ; $BT_{13.6}$; $BT_{6.7}$ Look for inversions, suggesting cloud-free.	
High thin cloud over snow	$R_{1.38}$; $(R_{0.65} - R_{1.6}) / (R_{0.65} + R_{1.6})$;	BT_{11} ; $BT_{13.6}$; $BT_{6.7}$ Look for inversions, suggesting cloud-free region.	

Scene	Solar/Reflectance	Thermal	Comments
Low cloud over vegetation	$R_{0.86}$, $R_{0.67}/R_{0.87}$, BT_{11}-$BT_{3.7}$; $(R_{0.86} - R_{0.65})/(R_{0.86} + R_{0.65})$;	Difficult, BT_{11} in combination with brightness temperature difference tests.	Ratio test is called, NDVI (Normalized Difference Vegetation Index). Other ratio tests have also been developed. Can make tests a function of ecosystem.
High Thick cloud over vegetation	$R_{1.38}$, $R_{0.86}$, $R_{0.67}/R_{0.87}$, $(R_{0.86} - R_{0.65})/(R_{0.86} + R_{0.65})$;	BT_{11} ; $BT_{13.9}$; $BT_{6.7}$ BT_{11}-$BT_{8.6}$, BT_{11}-BT_{12}	Can make tests a function of ecosystem to account for variations in surface emittance and reflectance.
High Thin cloud over vegetation	$R_{1.38}$, $R_{0.86}$, $R_{0.67}/R_{0.87}$, $(R_{0.86} - R_{0.65})/(R_{0.86} + R_{0.65})$;	$BT_{13.9}$; $BT_{6.7}$ BT_{11}-$BT_{8.6}$, BT_{11}-BT_{12}	Beware of variations in surface emittance and reflectance.
Low cloud over bare soil	$R_{0.86}$, $R_{0.67}/R_{0.87}$, BT_{11}-$BT_{3.7}$;	BT_{11} in combination with brightness temperature difference tests. $BT_{3.7}$-$BT_{3.9}$	Difficult due to brightness and spectral variation in surface emissivity. Surface reflectance at 3.7 and 3.9 μm is similar.
High Thick cloud over bare soil	$R_{1.38}$, $R_{0.86}$, $R_{0.67}/R_{0.87}$	$BT_{13.9}$; $BT_{6.7}$ BT_{11} in combination with brightness temperature difference tests.	
High Thin cloud over bare soil	$R_{1.38}$, $R_{0.86}$, $R_{0.67}/R_{0.87}$, BT_{11}-$BT_{3.7}$;	$BT_{13.9}$; $BT_{6.7}$ BT_{11} in combination with brightness temperature difference tests, for example $BT_{3.7}$-$BT_{3.9}$	Difficult; Be careful of surface reflectance at 1.38 μm. and variations in surface emittance.

Scene	Solar/Reflectance	Thermal	Comments
Cloud-top pressure		Absorption band of carbon dioxide (13-14μm)	
Cloud phase	Combination of $R_{0.86}$; $R_{1.6}$ and $R_{2.1}$	$BT_{11} - BT_{12}$ values of water clouds are greater than the $BT_{8.6} - BT_{11}$. Conversely, $BT_{8.6} - BT_{11}$ values of an ice cloud scene are greater than coincident $BT_{11} - BT_{12}$.	Not easy. Check absorption in bands as you change instruments. Determine phase by using observations that test for high cloud versus those that test for low.
Cloud particle size	Combination of $R_{0.86}$; $R_{1.6}$ and $R_{2.1}$; $R_{3.7}$	$BT_{8.6} - BT_{11}$ values versus $BT_{11} - BT_{12}$ is useful for thin high clouds.	