

5 *Meteorological phenomena*

MALCOLM ROSS

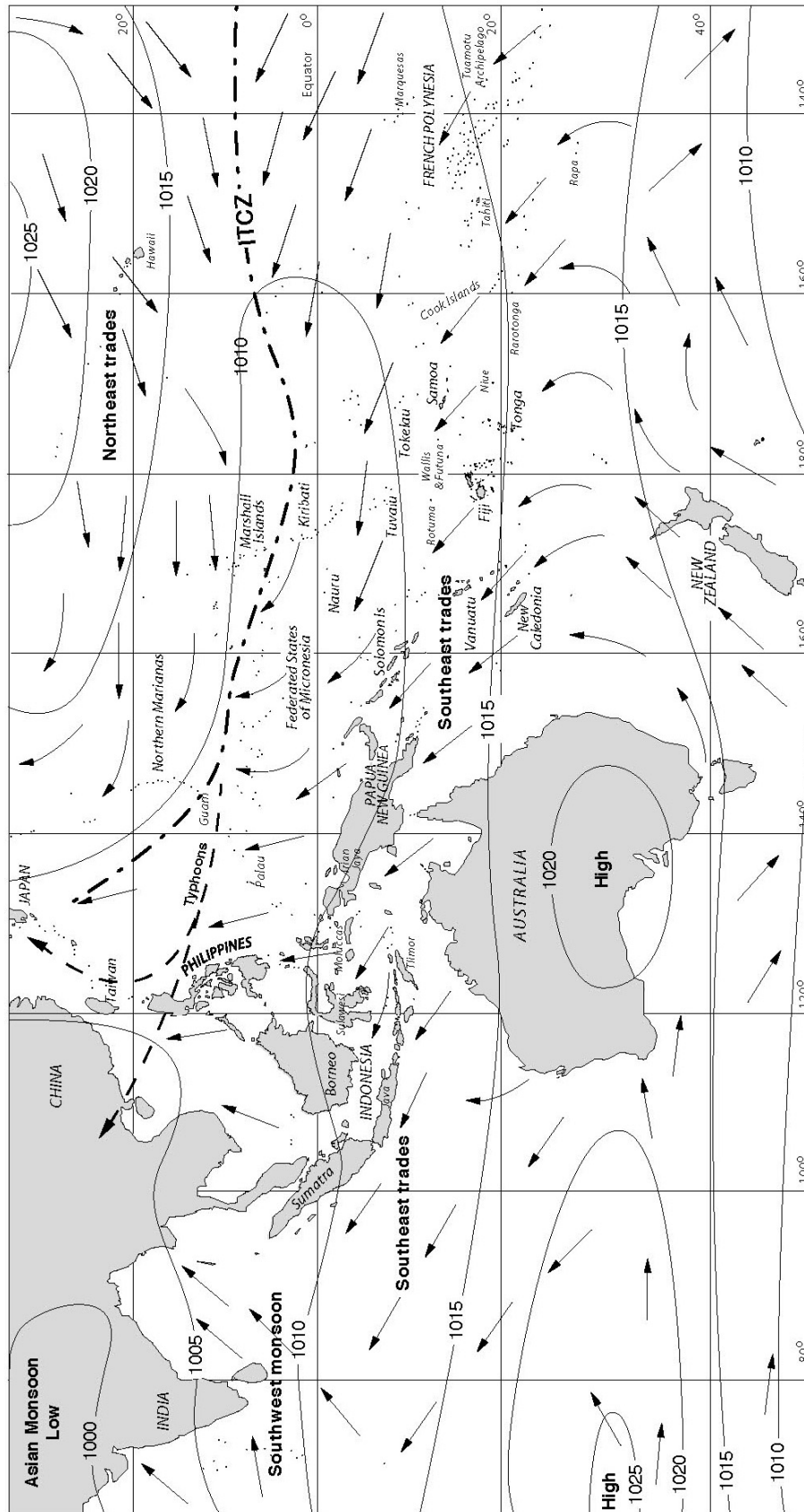
1 Introduction

The reconstruction of any terminology brings its own peculiar problems. In this case, the challenge was associated with the fact that meteorological conditions are not the same throughout the Austronesian speaking area. It is a necessary inference that as Austronesian speakers settled the regions they now occupy, they encountered new conditions which required adaptations in their terminology. Thus the meanings of the terms in a given language need to be related to the weather conditions which occur where the language is spoken. For this reason, §2 gives a short account of Pacific wind systems, while in §3 the weather patterns that Austronesian speakers encountered during their (largely eastward) migrations are described. Less trivially, a hypothesis about the semantic structure of POc speakers' weather terminology must rest on a hypothesis about where POc was spoken—and the same is true of any protolanguage for which weather terms are reconstructed. My assumption here that POc was spoken in the Bismarck Archipelago. I return to this matter in the concluding section.¹

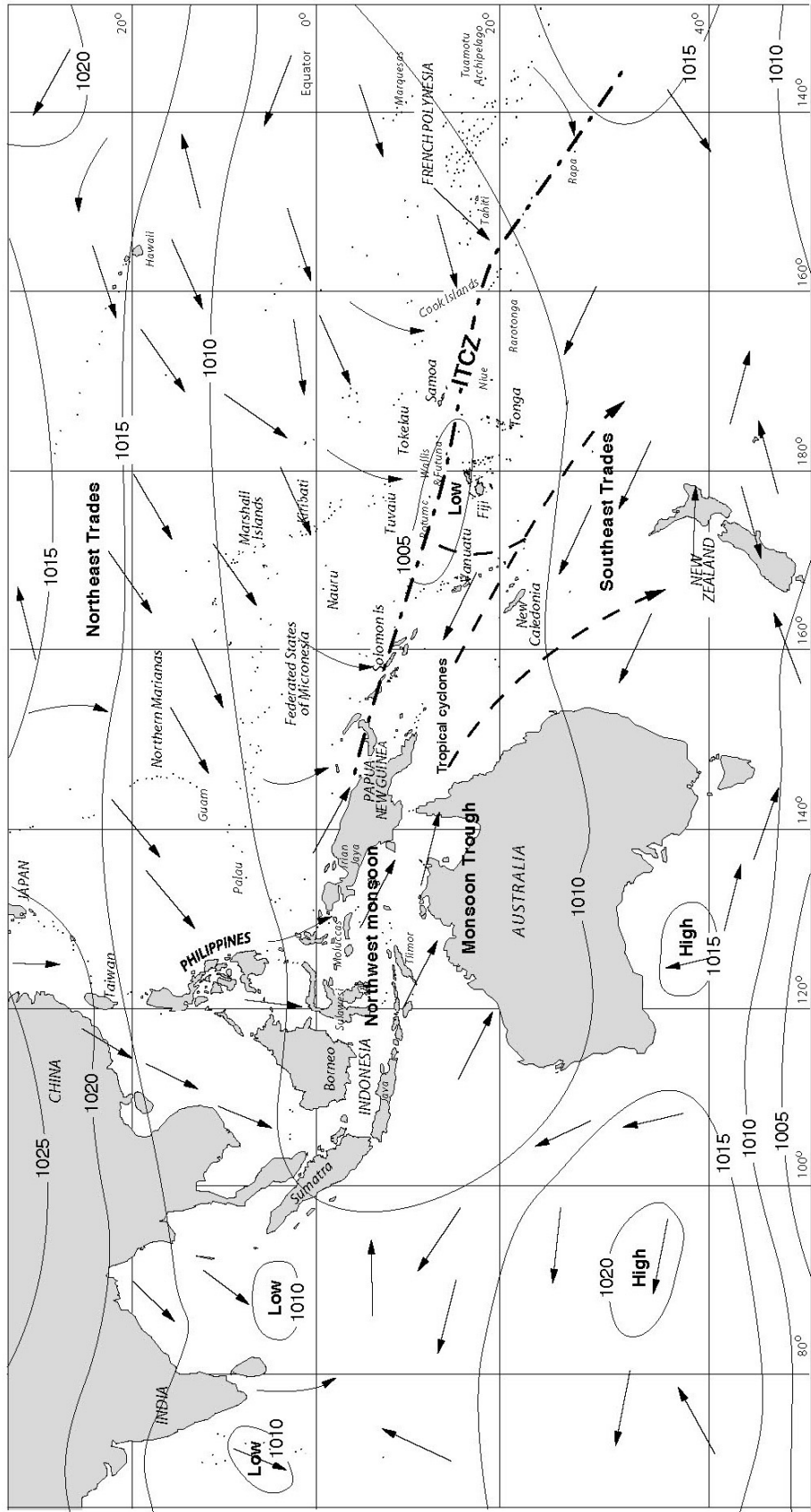
2 Pacific wind systems

The main planetary surface wind system affecting tropical regions consists of the trade winds. The trades blow from the sub-tropical high-pressure zones of both hemispheres to the equatorial low-pressure zone, but are deflected by the earth's rotation (the Coriolis effect) so that they blow from the southeast in the southern hemisphere and from the northeast in the northern. The equatorial low-pressure zone where the southeast and northeast trade winds meet is known as the Inter-Tropical Convergence Zone (ITCZ), colloquially 'the Doldrums'.

¹ This is a revised version of a paper published in *Oceanic Linguistics* 34:261–304 (1995). My thanks go to Andrew Pawley, Gerard Ward, Robert Blust, Robert Bugenhagen, Ann Chowning, Ross Clark, Mark Donohue, Alex François, Paul Geraghty, Charles Grimes, Waruno Mahdi and Meredith Osmond for their comments on earlier versions of this chapter.



Map 10: Prevailing winds in the Indian and Pacific Oceans during the southern hemisphere winter (July)



Map 11: Prevailing winds in the Indian and Pacific Oceans during the southern hemisphere summer (January)

The trade winds and the ITCZ are two of the major ingredients of the weather in the region inhabited by Austronesian speakers. Map 10 provides a general overview for the period from (roughly) April to October.²

The trades are noted for their consistency and force, especially over the eastern side of the ocean (Hawaii has quite consistent trade wind flow, bringing sunshine with sporadic cumulus and some humidity). Over the western Pacific (e.g. in the Bismarck Archipelago), they are less consistent because of monsoonal and other disturbances. Near their high-pressure source the trade winds are quite dry, but as they blow over the ocean towards the Equator they pick up moisture which they deposit as orographic rain when they hit high islands. Orographic rainfall occurs when air is forced to ascend the side of a mountain range, and is particularly common where mountains lie parallel to the coast over which blow moist winds from the sea. This is the situation on the large islands of the Philippines; in Papua New Guinea on Manus Island, the tip of Papua, the Huon Peninsula and the island of New Britain; in the New Georgia group and on Guadalcanal in the Solomons; and on the high islands of Fiji. All of these experience heavy rain on their windward coasts during the trades, whilst areas in the lee of their mountain ranges remain relatively dry. In these areas the trades are therefore associated with rain (and sometimes with the rainiest season), whereas in most Pacific locations they bring the dry season.

The ITCZ has weather effects of a different kind. It is a low-pressure belt with relatively little wind but various local perturbations. Incoming airflow has nowhere to go but up—in large numbers of isolated columns. Each island becomes capped with a cloud build-up resulting from evaporation due to the sun's heat and there is thundery convectional rain, but little lee effect. Thus the ITCZ is characterised by frequent, more or less windless rainfall.

On non-monsoonal Pacific islands (i.e. islands well away from the land masses of Australia and mainland Asia) the main determinant of seasonal variation is the annual movement of the ITCZ. Because most of the languages I am concerned with in this paper are spoken in places south of the Equator, I will refer to the seasons as the southern hemisphere 'winter' (SHW) and the southern hemisphere 'summer' (SHS), using these terms also to refer to the northern hemisphere 'summer' and 'winter' respectively.

The movement of the ITCZ roughly tracks the zenith sun southward in the SHS, northward in the SHW. This movement is visible if one compares Maps 10 and 11. But because the northern hemisphere has larger land masses than the south, forming the areas of greatest heating, the mean annual position of the ITCZ generally lies well north of the Equator. On the leading edge of the ITCZ (the south in the SHS, the north in the SHW), tropical cyclones—'typhoons' in the northwest Pacific—sometimes arise. They are small intense low-pressure systems. The wind whirls around them, often with torrential rainfall, as they move away from the ITCZ. The movement of the ITCZ of course means that the trades system also moves with the seasons: the southeast trades blow further north in the SHW, the northeast trades further south in the SHS.

² This section is based on general information about wind systems culled from Monkhouse (1966:Chs. 16 and 18), Hare (1984), Lamb (1984) and Irwin (1992) and on information about Pacific weather from Howlett (1967:36–38), Brookfield with Hart (1971:5–13), Cotter (1984); Gentili (1984), and the *Atlas of the South Pacific* (New Zealand Government Printing Office, 1986). One difficulty that I encountered in writing this short conspectus was that there is disagreement in the literature about the weather patterns at some Pacific locations.

Among non-monsoonal Pacific islands there are just a few inhabited locations which lie more or less constantly within the ITCZ despite its movement and hence have little seasonal variation in temperature or rainfall. These include the northern islands of Kiribati and the southern Marshall Islands between about 2° N and 6° N.

On other non-monsoonal islands there are two asymmetric seasons—a ‘wet’ and stormy season of about four months when the more intense effects of the ITCZ are felt, and a ‘dry’ and stormfree season during the rest of the year when the trade winds blow more or less without interruption. However, the terms ‘wet’ and ‘dry’ are merely relative in many Pacific locations, and exceptions to this pattern in any case occur where the trades bring heavy orographic rain.

In the southern hemisphere, when the ITCZ moves south in the SHS bringing the ‘wet’, islands closer to the Equator (easternmost parts of the island of New Guinea and the Bismarck Archipelago, the northern Solomons, Tuvalu, Tokelau) are directly within the ITCZ and receive relatively windless convectional rains. When the wind does blow, it is generally from the northwest. Islands further south (the southern Solomons, Vanuatu, Fiji, Tonga, Samoa) experience variable weather as the southeast trades are sporadically disrupted by westerly and northwesterly winds and tropical cyclones caused by perturbations in the ITCZ.

Non-monsoonal islands in the northern hemisphere experience the converse seasonal regime. When the ITCZ moves north in the SHW, the northeast trades are interrupted by wet weather with westerly and southwesterly winds and typhoons.

The main disruptions to the regime described above are the seasonal reversals of pressure and wind over the land masses and neighbouring oceans which are known as monsoons, which affect the weather on the islands close to the land masses of Australia and mainland Asia. Monsoons are caused by the summer heating of the land, which effectively causes an extension of the equatorial low-pressure zone well north into Asia in July and south into northern and central Australia in January.³ The Asiatic low-pressure area centring on northwestern India is so intense that it supersedes the equatorial low in the SHW, so that the southeast trades cross the Equator and become the southwest monsoon in peninsular India, whilst Malaysia, Indonesia, the Philippines, China and Japan experience winds from the south, varying to southeast and southwest as they blow in towards the heated continent. This phenomenon can be seen in Map 10. The extension of the equatorial low into Australia in the SHS is less intense, but is sufficient to draw the northeast trades across the Equator, where they become the northwest monsoon, bringing cloudy and rainy weather to Indonesia and western and southern parts of the island of New Guinea (see Map 11). From the perspective of this paper, the most important effect of the monsoon is that it brings a marked seasonal reversal. Whereas the wet on non-monsoonal islands either consists of the windless rain of the ITCZ or of variable, stormy weather, the monsoon draws the trade winds across the Equator into the opposite hemisphere, eliminating the doldrums and giving a clear reversal of wind direction.

³ A geographer expert in this field would probably consider this definition an oversimplification, but it will suffice for present purposes (Gentili 1984:389).

3 The Austronesian weather experience⁴

It is clear from this account of wind systems in Austronesian speaking areas that people in different parts of the area experience somewhat different configurations of wind and season. It follows from this that during their spread through the region, Austronesian speakers encountered new weather conditions and had either to adapt old terms to new conditions or to add new terms to their vocabularies.

Table 3 summarises the seasonal conditions pertaining in various Austronesian speaking areas. It is at best a crude summary, as local conditions may change considerably from one side of an island to the other, especially where orographic rain occurs. The locations are set out in very roughly the sequence in which I assume them (on the basis of Figure 1) to have been occupied by Austronesian speakers.

I assume that Proto Malayo-Polynesian was spoken in the northerly part of the Philippines. Here the northeast trades prevail in the SHS, but are replaced by monsoonal southerlies in the SHW. On the larger islands this means that east-facing slopes receive orographic rain during the trades and convectional rains in the monsoon, whilst west-facing slopes get orographic rain during the monsoon and have drought during the trades (Alip & Borlaza 1984). During the monsoon typhoons often strike the northern and central islands, but Benedek (1991:13) reports for the islands between the Philippines and Taiwan that there is sometimes a period when the sea is becalmed and the heat becomes intolerable.

As Austronesian speakers moved south into Mindanao and then Borneo, Sulawesi and perhaps Halmahera, they left the trade winds behind and entered the equatorial region with two monsoon seasons where rain falls all the year round. North of the equator, the accustomed monsoonal southerlies or southwesterlies continued in the SHW, but in the SHS the northeast trades became the northeast monsoon as they accumulated moisture prior to crossing the Equator. When our travellers crossed the Equator, they experienced a reorientation of wind directions: the southerly monsoon of the SHW became decidedly southeasterly or easterly, whilst the northeast monsoon of the SHS veered to the northwest or west.

Even in the equatorial zone, there is some seasonal variation in rainfall, the peak occurring in the SHS when the airflow is from Asia to Australia. This difference became more pronounced the further south and east (i.e. the closer to Australia) Austronesian speakers moved, and Sumba and Timor are quite dry during the SHW when the easterly monsoon brings dry air from Australia. By the time it reaches western Indonesia or moves north of the Equator and becomes the southwest monsoon, its winds have become humid and a source of rain, so that Sumatra and Borneo have no dry season, whilst Java divides into a wet west (from orographic rain) and a dry east (McDivitt 1984).

When Austronesian speakers travelled eastwards, probably from Halmahera, and moved along the north coast of the island of New Guinea, they gradually experienced a lessening of the effects of the southeast monsoon, as the central cordillera provided an increasingly large obstacle to it. The northwest monsoon of the SHS continued to provide the rainy season, however.

⁴ As well as the sources indicated in the text, this section relied quite heavily on Brookfield and Hart (1971), Gentili (1984), and the *Atlas of the South Pacific* (New Zealand Government Printing Office, 1986).

As the migrants emerged from the lee of the cordillera onto the Huon Peninsula and crossed to New Britain, two things occurred which presumably came to be reflected in POc terminology. First, they had left the monsoonal region behind them, and during the SHS they experienced the fairly windless rainy season of the ITCZ, with some sporadic northwesterly winds. Secondly they encountered for the first time the southeast trades of the SHW, during which the north coasts of the Huon Peninsula and of New Britain have their dry season, whilst their south coasts suffer torrential orographic rain (Howlett 1967:36–38). As they later spread around the coasts and offshore islands of Papua New Guinea and into the Bismarck Archipelago and then the New Georgia group of the northwest Solomons, they continued to encounter this and other kinds of local variation, but the southeast trades always continued to be the prevailing winds.

Table 3: Approximate summary of seasons in some Pacific locations

	Southern Hemisphere Winter	Southern Hemisphere Summer
Philippines	southwest monsoon, wet season; in centre and north some cyclones	northeast trades, dry season, orographic rain
Sumatra, Borneo	in north, southwest monsoon; in south, southeast monsoon; humid wind and rain	in north, northeast monsoon in south, northwest monsoon, clouds and rain
rest of Indonesia	southeast monsoon, dry season; in west, some orographic rain	northwest monsoon, clouds and rain
Manus Island, New Britain, Huon Peninsula, tip of Papua	southeast trades, heavy orographic rain	ITCZ convectonal rain
Papua New Guinea rest	southeast trades, dry season	ITCZ convectonal rain
New Georgia group	southeast trades heavy orographic rain	ITCZ convectonal rain
rest of northwest Solomon Islands	southeast trades dry season	ITCZ convectonal rain
southeast Solomon Islands, Vanuatu, New Caledonia	southeast trades dry season	variable stormy weather some cyclones
Fiji	southeast trades, dry season heavy orographic rain	variable stormy weather some cyclones
Tonga, Samoa, Wallis, Futuna, Cooks, Tahiti, Tuamotus	southeast trades dry season	variable stormy weather some cyclones
Tuvalu, Tokelau, southern Gilberts, Nauru	southeast trades humid wind, some rain	ITCZ convectonal rain
northern Gilberts, southern Marshalls	ITCZ convectonal rain	ITCZ convectonal rain
northern Marshalls, Carolines	variable stormy weather	northeast trades some rain
Hawaii	northeast trades some orographic rain	northeast trades some orographic rain

As Oceanic speakers moved further into the Pacific, the lie of the islands ensured that they first also moved further south as well as east. In the southeast Solomons, Vanuatu, New Caledonia, Fiji and Samoa this took them right out of the ITCZ into the southern tropical zone where the rainy season of the SHS is relatively short (around four months) and the winds are variable: sometimes the southeast trades continue to penetrate, but often they are disrupted by stormy northwesterlies and sometimes by cyclones. There is a long dry season when the southeast trades blow consistently, except when they deposit orographic rain on high islands, particularly in Fiji.

It was from somewhere in this zone that Oceanic speakers moved northwards into Micronesia. In Tuvalu and the southern Gilberts⁵ they encountered a climate similar to that of the smaller islands in the Bismarcks: the southeast trades continue to predominate, but become more moist nearer to the Equator, and the northwesterlies and cyclones give way again to the much less windy wet season of the ITCZ. Further north, in the northern Gilberts and southern Marshalls, they found themselves permanently in the ITCZ, with relatively little wind and a good measure of convectional rain. Finally, in the scattered archipelagoes of the northern tropical zone—the northern Marshalls, the Carolines and the Marianas—they left the ITCZ to their south and entered a region in which the climate is the converse of that in the southern tropical zone. Here in nuclear Micronesia there is a long dry season when the northeast trades prevail in the SHS and a short rainy season with variable winds and storms in the SHW.

In the sections below I set out my reconstructions of POc terms referring to and associated with winds and the weather.

4 Winds

4.1 Wind and wind strengths

Winds seem to have been classified in two ways in POc. In this section I will present generic terms for wind and wind strengths, in the next section terms for seasonal winds and wind directions.

The generic term for ‘wind’ in POc was **aŋin*, which continues PMP **haŋin*.

PMP **haŋin* ‘air, wind’ (Dempwolff 1938)

POc **aŋin* ‘wind’

NNG:	Mangap	<i>yaŋ</i>	‘rain’
NNG:	Bing	<i>yaŋ</i>	‘wind’
PT:	Minaveha	<i>yagina</i>	‘wind’
PT:	Wedau	<i>ḍayina</i>	‘wind’
PT:	Balawaia	<i>ayi</i>	‘wind’
PT:	Motu	<i>lai</i>	‘wind’
MM:	Konomala	<i>yaŋin</i>	‘wind’
NCV:	Port Sandwich	<i>n-ean</i>	‘wind’
Mic:	Kiribati	<i>aŋ</i>	‘wind’
Mic:	Woleaian	<i>yaŋ</i>	‘wind’

⁵ Tuvalu is today Polynesian speaking, but may well once have been colonised by the people who first entered the Gilberts. I use the term ‘Gilberts’ here to denote the island group, rather than ‘Kiribati’, which denotes the national entity that also includes the Phoenix and Line Islands.

Fij:	Bauan	<i>ḍaŋi</i>	‘wind’
Pn:	Tongan	<i>aŋi</i>	‘(wind, breeze) blow’
Pn:	Samoan	<i>aŋi</i>	‘(wind, breeze) blow’

Three terms for winds of differing strengths are reconstructable. POc **jaŋi* referred to a strong wind, **sau/*sau-ŋ(a)* and **mur[i,e]* to breezes. It seems that **sau* was a verb (‘blow freshly’), and **sau-ŋ(a)* a nominalisation referring to the breeze itself. I cannot reconstruct a difference in meaning between **sau* and **mur[i,e]*.

POc **jaŋi* (N) ‘strong wind; (?) (V) ‘be windy’

NNG:	Bing	<i>sāŋ</i>	‘wind strong directly against’
NNG:	Mapos Buang	<i>saŋ</i>	‘strong winds which blow up the valley around November’
SES:	Arosi	<i>daŋi</i>	‘wind’
SES:	Sa’a	<i>deŋi</i>	‘wind’
NCal:	Nemi	<i>dān</i>	‘wind’
Pn:	Tongan	<i>(ma)taŋi</i>	(N) ‘wind’, (V) ‘be windy’
Pn:	Samoan	<i>(ma)taŋi</i>	(N) ‘wind’, (V) ‘be windy, stormy’

POc **sau* (V) ‘(breeze) blow’, (?) (N) ‘breeze’; **sau-ŋ(a)* (N) ‘breeze’

Adm:	Lou	<i>soso</i>	‘wind, breeze’
Adm:	Titan	<i>só-sou-n</i>	‘wind from a particular direction’
NNG:	Kilenge	<i>-sou</i>	‘(wind) blow’
NNG:	Bilibil	<i>sau</i>	‘rain’
NNG:	Poeng	<i>saū</i>	‘wind; large, damaging with black, foreboding sky’
MM:	Solos	<i>seou-ŋ</i>	‘wind’
SES:	Gela	<i>sau(toŋa)</i>	‘north wind’
Fij:	Wayan	<i>ḍau-ḍau</i>	‘light to moderate wind, of early mornings and early evenings’
Fij:	Bauan	<i>ḍau-ḍau</i>	‘land breeze’
Pn:	Rapanui	<i>hau</i>	‘breeze, wind; blow freshly; cool’
Pn:	Hawaiian	<i>hau</i>	‘cool breeze’
Pn:	Maori	<i>hau</i>	‘wind, breeze’
Pn:	W Futunan	<i>sau</i>	‘(wind) blow; sound of wind’

POc **mur[i,e]* (N) ‘breeze’; (V) ‘blow gently’

NNG:	Lukep (Pono)	<i>muru</i>	‘breeze’
NNG:	Mangap	<i>mīri</i>	‘wind’
		<i>mir-mīri</i>	‘little breeze’
NNG:	Kilenge	<i>na-mule</i>	‘wind’
NNG:	Yabem	<i>mu</i>	‘wind’
MM:	Tabar	<i>mur</i>	‘wind’
Fij:	Rotuman	<i>mure</i>	‘blow gently’
Fij:	Bauan	<i>mudre</i>	(V) ‘(wind) blow gently’, (N) ‘cool breeze’, (ADJ) ‘cool, breezy’ (- <i>dr-</i> for expected <i>*-r-</i>)

Fij:	Wayan	<i>mure</i>	‘(breeze) blow lightly’
Pn:	Maori	<i>muri-muri</i>	‘breeze’
Pn:	Tuamotuan	<i>mure</i>	‘fail (of breath)’

The terms below may also reflect POc **mur[i,e]*, but with a change in meaning.

NNG:	Amara	<i>o-mur</i>	‘southeast trade’
NNG:	Bing	<i>mur-mōriy</i>	‘wind which blows strongly from the west, often causing damage’
PT:	Motu	<i>miri(gini)</i>	‘north wind’
PT:	Mekeo	<i>mili(kini)</i>	‘north wind’

The Mangap, Motu and Mekeo terms have *-i-* where *-u-* is expected. This may reflect vowel assimilation.

Another term for wind was POc **mal(i,e)u*, but it is not possible to determine its meaning precisely from its reflexes. In Proto Micronesian, it referred to a typhoon, but this was presumably its denotation after the ancestral Micronesians crossed out of the ITCZ into the northern hemisphere.

POc **mal(i,e)u* ‘wind’

SJ:	Sobei	<i>maro</i>	‘wind’ (<i>-o</i> < <i>*-ew</i>)
PT:	Tawala	<i>malewa</i>	‘favourable wind, wind from behind’ ⁶
MM:	Lavongai	<i>malu</i>	‘(wind) blow’
MM:	Kara (West)	<i>maliu</i>	‘wind’
MM:	Nalik	<i>maliu</i>	‘wind’
MM:	Notsi	<i>mal</i>	‘wind’
MM:	Madak	<i>man-man</i>	‘wind’
MM:	Maringe	<i>maloa</i>	‘air, open space’ (<i>-oa</i> < <i>*-ewa</i>)
Mic:	Mokilese	<i>mɛl-mɛl</i>	‘storm, typhoon’
Mic:	Ponapean	<i>meli-mel</i>	‘windstorm, typhoon’
Mic:	Woleaian	<i>marɨ-mer</i>	‘storm, typhoon’

In Ross (1995a) I wrote:

my attempts to reconstruct POc terms for ‘typhoon’, ‘cyclone’ and ‘whirlwind’ have failed completely. On reflection, this is not surprising, as I have hypothesised that POc was spoken in the Bismarcks—too close to the Equator and to the ITCZ to be affected by winds of this kind.

Lynch (1997), however, points out that there is a South Vanuatu reflex of PAn **baRiuS* ‘typhoon’, and that POc **paRiu* ‘cyclone’ is therefore reconstructable. The lack of reflexes elsewhere is perhaps to be attributed, then, to their loss in languages whose speakers do not normally experience cyclones.

PAn **baRiuS* ‘typhoon’

POc **paRiu* ‘cyclone’

SV:	Anejom	(<i>n</i>) <i>eheyo</i>	‘cyclone, hurricane’
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⁶ Tawala *malewa* includes the final *-a* which is added after a final consonant, indicating that at an interstage ancestral to Tawala **malew*, rather than **maleu*, should be reconstructed.

Although a number of etyma referring to a wind seem to have been used both as a noun denoting that wind and as a verb expressing the action of the particular wind, there are also several reconstructable POc terms which seem to have been primarily used as verbs of blowing with reference to winds or people.

Three of these, **upi*, **ipu* and **ip^(w)i*, are clearly related to each other phonologically. The pair **upi* and **ipu* ‘blow’ are strikingly parallel to POc **ubi/*ibu* ‘half coconut shell used as a drinking cup’, and it is possible that both pairs were generated at the same time by the application of a single rule (or similar wordplay) to the pre-existing member of each pair. In the case of POc **upi/*ipu* ‘blow’, it seems likely that the pre-existing member was **ipu*, since it can be traced back to PMP **ibut* ‘breeze, draught of wind’, and that **upi* was the late-generated form. However, its generation predates POc, as Blust has reconstructed PCEMP **upi* ‘(wind, person) blow’ (1993).⁷ Similarly, the generation of the pair **ubi/*ibu* ‘half coconut shell ...’ also predates POc, as both forms are reconstructable in Proto Eastern Malayo-Polynesian (Blust 1978a).

PCEMP **upi* ‘(wind, person) blow’ (Blust 1993)

POc **upi* ‘(wind, person) blow’ (cf. vol. 1, pp.107–108)

Adm: Seimat	<i>uhi</i>	‘blow on the fire’
NNG: Mangap	<i>-wi</i>	‘(wind) blow’
NNG: Apalik	<i>uwi</i>	‘northwest monsoon’
NNG: Takia	<i>-wi</i>	‘(wind) blow’
NNG: Yabem	<i>yu</i>	‘(s.o.) blow’
NNG: Kaiwa	<i>u</i>	‘(wind) blow’
NNG: Misim	<i>yuv</i>	‘(wind) blow’
NNG: Vehes	<i>vin</i>	‘wind’
NNG: Mangga	<i>va-vi</i>	‘wind’
NNG: Medebur	<i>-wi</i>	‘(wind) blow’
MM: Tabar	<i>uvi</i>	‘(wind) blow’
SES: Gela	<i>uvi-uvi</i>	‘blow with the breath, play pipes’
SES: Lau	<i>ufi</i>	‘blow with the mouth; blow a conch or panpipes’
SES: Arosi	<i>uhi</i>	‘blow, breathe on’
NCV: Mota	<i>uw</i>	‘blow with the mouth, or of wind’
NCV: Raga	<i>uvi</i>	‘blow’
NCV: Paamese	<i>uhi</i>	‘blow’
Fij: Wayan	<i>uvi, uvu</i>	‘(fire, flute) be blown with the mouth, (ball, balloon) inflated, blown up’
	<i>uvi</i>	‘blow s.t. with the mouth’

In a number of NNG languages in the region of the Vitiaz Strait and the Huon Gulf, a nominalised form of **upi* ‘blow’ has become the generic term for ‘wind’ (see vol. 1, pp.33–34 with regard to nominalising morphology):

⁷ Blust (1993) derives PCEMP **upi* from PMP **hiup* ‘blow’, and it is possible that the generation of pairs was triggered by the existence of similar forms with close meanings.

PNNG **upi-ŋ(a)* ‘wind’

NNG: Atui	<i>uvin</i>	‘wind’
NNG: Kaiwa	<i>(wa)vin</i>	‘wind’
NNG: Duwet	<i>fiŋ-fiŋ</i>	‘wind’
NNG: Danggal	<i>fiŋ</i>	‘(wind) blow’
NNG: Silisili	<i>fiʔg</i>	‘wind’
NNG: Adzera	<i>fi-fiŋ</i>	‘strong, fierce wind’

PMP **ibut* ‘breeze, draught of wind’ (ACD)POc **ipu* ‘(wind) blow’ (cf. vol. 1, pp.107–108)

NNG: Bing	<i>yu</i>	‘(wind) blow’
NNG: Sissano	<i>-iu</i>	‘(wind) blow’
MM: Tinputz	<i>viu</i>	‘(wind) blow’ (metathesis)
MM: Mono	<i>ihu</i>	‘(wind) blow’
MM: Lungga	<i>ivu</i>	‘blow’
MM: Roviana	<i>ivu-a</i>	‘blow on (fire), blow into (conch)’
MM: Maringe	<i>ifu</i>	‘blow’
SES: Bugotu	<i>ifu</i>	‘blow (fire, pan-pipes)’

It seems likely that the form **ip^(w)i* is the result of an idiosyncratic change to **upi*, **ipu* or both. A couple of forms, NNG: Kaulong *e-ip* ‘the wind’ and MM: Nalik *if* ‘(wind) blow’, may reflect either **ipu* or **ip^(w)i*.

POc **ip^(w)i* ‘(wind, person) blow’

MM: Ramoaina	<i>ipi</i>	‘(wind) blow’
MM: Tolai	<i>ipi</i>	‘(wind) blow’
MM: Teop	<i>ivi</i>	‘(wind) blow’
Pn: Tongan	<i>ifi</i>	‘blow with the mouth; blow or blow into or play (a whistle, or wind instrument)’
Pn: Samoan	<i>ifi</i>	‘blow smoke’
Pn: Maori	<i>ihi</i>	‘blow, of wind’

Two other forms meaning ‘blow’ are also reconstructable. These are also formally rather similar to each other, but this similarity evidently dates back to well before the genesis of POc. I know of no proper non-Oceanic cognates of POc **p^(w)usi*, but it appears to reflect the same monosyllabic root (**bus*) as PMP **qembus* ‘snort, pant’ (ACD) (with regard to monosyllabic roots, see vol. 1, pp.27–28).

POc **p^(w)usi* ‘(wind) blow’

NNG: Aria	<i>-pu</i>	‘(wind) blow’
NNG: Sengseng	<i>pe-puh</i>	‘wind’
NNG: Numbami	<i>pusie</i>	‘(wind) blow’
NNG: Patep	<i>plu</i>	‘blow’
MM: Konomala	<i>fus</i>	‘(wind) blow’
MM: Minigir	<i>vusu</i>	‘(wind) blow’
MM: Tolai	<i>vu</i>	‘(wind) blow’
MM: Hahon	<i>vus</i>	‘wind’

MM:	Tinputz	<i>vuh</i>	‘wind’
SV:	Sye	<i>o-vosi</i>	‘wind’ (Lynch 1978b)
Pn:	Rennellese	<i>pusi</i>	‘(wind) blow; blow (flute)’
Pn:	Maori	<i>pu-puhi</i>	‘blow (as the wind, a whale); shoot (as a gun)’

The initial *p-* of the Pn items reflects POc **b-* or **p^w-*: hence the suggestion that there was a POc alternant **p^wusi*.

PAN **pu+put* ‘blow’ (Zorc 1994)

PMP **putput* ‘puff, blow suddenly and hard’

POc **(pu)put* ‘(wind) blow’

MM:	Kara (West)	<i>fifit</i>	‘(wind) blow’
MM:	Siar	<i>fut</i>	‘(wind) blow’
MM:	Selau	<i>wut</i>	‘(wind) blow’
MM:	Papapana	<i>pute</i>	‘wind’

4.2 Seasonal winds

If POc speakers lived in the Bismarcks, then they encountered two seasons: the dry, when the southeast trades blew with reasonable consistency, and the wet, when there were sporadic northwesterly winds. The POc terms for the winds associated with these seasons were respectively **raki* and **apaRat*. They may also have referred to the seasons, with typical weather and wind direction as inevitable components of their meanings, as well as having associations with navigability and agriculture. Modern uses of wind terms suggest strongly that they also served as terms for cardinal directions in POc, and that the two major wind directions were perhaps the only cardinal directions for POc speakers (Ch. 8, §1).

POc **raki* ‘southeast trades’ has no obvious non-Oceanic cognates. This is hardly surprising. When Austronesian speakers came out of the lee of the New Guinea cordillera into the Bismarcks and encountered the southeast trades of the SHW and the attendant dry season, they met what was for them a new phenomenon. The only part of Indonesia with a similar season is in the southeast in the area around Timor, where the southeast monsoon brings a dry season. But it is unlikely that people ancestral to Oceanic speakers migrated via that area.

POc **raki* probably also denoted the dry season when the southeast trades blow. In the Admiralties its reflex refers to a northeasterly wind, in Micronesia to the southerly direction and to the summer season (SHW) when the breadfruit grow. In both cases, the seasonal conditions familiar to POc speakers do not occur. On Manus Island in the Admiralties, there is a double rainfall maximum and no true dry season. Micronesia lies north of the Equator and has seasons the converse of those of POc. In both cases, reflexes of **raki* have been applied to a new referent. In the Admiralties it has retained its association with a cooler wind and now applies to a cool wind from the mountains of Manus Island. In Micronesia it refers to the same period of the year and roughly the same wind direction as in POc, but because of the northern tropical location it now refers to the wet season rather than the dry. It is noteworthy, however, that in both the Admiralties and Micronesia, **raki* continues to have a referent which is considered to be pleasant—in the

Admiralties because the wind is cool, in Micronesia because the season produces breadfruit.

A selection of data supporting the reconstruction of **raki* follows.

POc **raki* ‘southeast trades’ (probably also ‘dry season when the southeast trades blow’)

Adm:	Lou	<i>ra</i>	‘northeast, northeast wind’
Adm:	Titan	<i>ⁿray</i>	‘wind from the mainland, mountain breeze, blows at night’
NNG:	Kove	<i>hai</i>	‘southeast trade, year’
NNG:	Bariai	<i>rai</i>	‘year’
NNG:	Gitua	<i>rak</i>	‘southeast trade’
NNG:	Lukep	<i>rai</i>	‘year’
NNG:	Mangap	<i>rak-rak</i>	‘fresh morning (during windy season)’
NNG:	Tami	<i>lai</i>	‘southeast trade’
NNG:	Maleu	<i>na-lai</i>	‘southeast trade’
NNG:	Ali	<i>rai</i>	‘southeast trade’
NNG:	Tumleo	<i>riei</i>	‘southeast trade’
MM:	Vitu	<i>rayi</i>	‘southeast trade’
MM:	Bulu	<i>layi</i>	‘southeast trade’
MM:	Tigak	<i>rei</i>	‘wind’
NCV:	Lewo	<i>lagi(pesoi)</i>	‘east wind’
Mic:	Marshallese	<i>ɾ^{uu}ak</i>	‘south, summer’
Mic:	Ponapean	<i>rāk</i>	‘breadfruit season, season of plenty’
Mic:	Woleaian	<i>zaxi</i>	‘year, age, summer season’
Fij:	Wayan	<i>draki</i>	‘weather’
Fij:	Bauan	<i>draki</i>	‘weather’

PPn **laki* ‘southwesterly quadrant, southwest wind and weather associated with it’

Pn:	Niuean	<i>laki</i>	‘west’
Pn:	E Uvean	<i>laki</i>	‘southeast or southwest wind’
Pn:	Pukapukan	<i>laki</i>	‘southwest wind’
Pn:	Samoan	<i>laʔi</i>	‘southwest veering to northwest’
Pn:	Tokelauan	<i>laki</i>	‘hurricane season and westerly quarter winds that blow during it’
Pn:	Anutan	<i>laki</i>	‘the whole southwestern quadrant; westerly or southwesterly wind; the period of the year when the wind is from that quarter’
Pn:	Rennellese	<i>gaki</i>	(N) ‘west or southwest wind’; (V) ‘(of this wind) blow’
Pn:	Takuu	<i>laki</i>	‘season of westerly winds’
Pn:	Hawaiian	<i>laʔi</i>	‘calm, stillness, quiet (of sea, sky, wind)’
Pn:	Tuamotuan	<i>raki</i>	‘wind from southwesterly quadrant’

Much of the data for the reconstruction of PPn wind directions is drawn from Biggs and Clark (1993), but the glosses of the protoforms are mine. For example, for PPn **laki* Biggs and Clark give the gloss ‘the westerly quarter, wind from that quarter and weather associated with it’. If this were its denotation, we might expect reflexes to range in

meaning between northwest and southwest, but no reflex denotes a direction north of west. From this I infer that it denoted the southwesterly quadrant. Similar argumentation applies to PPn **toŋa* 'southeasterly quadrant, southeast wind' and PPn **tokelau* 'northwesterly quadrant, north-west winds' below.

POc **apaRat* 'northwest wind' has non-Oceanic cognates. It is descended from PMP **habaRat*, and from the reflexes listed below, I infer that this meant 'southwest monsoon, wet season' in its homeland. However, in Mindanao, where Manobo is spoken, there are two monsoons, the southwest and the northeast. Because the northeast monsoon is a much moistened version of the northeast trades, it evidently blows harder than the southwest monsoon and has taken over the 'monsoon/wet season' label. When the northeast monsoon changes direction to northwest south of the Equator, it retains the same label right across Indonesia, and POc **apaRat* 'northwest wind' is its natural continuation in the Bismarcks.

PAn **SabaRat* '(?) south wind' (ACD; Zorc 1994: 'monsoon wind')

PMP **habaRat* 'west monsoon' (Dempwolff 1938, ACD)

WMP: Belau	<i>ŋəbarð</i>	'west wind' (Josephs 1990)
WMP: Yami	<i>kavalat-an</i>	'west or southwest wind' (Benedek 1991)
WMP: Itbayat	<i>havayat</i>	'west wind (blows from late July to September)'
WMP: Tagalog	<i>habagat</i>	'west or southwest wind; monsoon'
WMP: Bikol	<i>habagat</i>	'south wind'
WMP: Cebuano	<i>habagat</i>	'strong wind that hits Cebu from the southwest, common from June to September'
WMP: Manobo	<i>evayat</i>	'the strongest wind: the northeast monsoon' (Elkins 1968)
WMP: Tiruray	<i>barat</i>	'the rainy season'
WMP: Aceh	<i>barat</i>	'west, westerly'
WMP: Old Javanese	<i>barat</i>	'strong wind, storm; west'
WMP: Wolio	<i>bara</i>	'west, west monsoon'
CMP: Manggarai	<i>warat</i>	'rainy season (primarily in January and February); violent storm'
CMP: Buru	<i>fahat</i>	'west monsoon'
SHWNG: Numfor	<i>barek</i>	'west'
	<i>(wam)barek</i>	'west wind or monsoon'

POc **apaRat* probably also denoted the accompanying wet season (SHS). The glosses of a number of its reflexes denote the wind direction rather than the season, whereas we might expect *a priori* that the word would refer primarily to the season rather than to the wind, as the latter does not blow consistently. This may be a product of elicitation techniques which asked for wind names rather than for seasons. In any case, there is no serious competitor for 'wet season', and a sufficient spread of reflexes referring to the season, to rain, to rough seas and to storms to establish **apaRat* as the word for the season as well as for the wind. In Central Pacific languages (Fijian and Polynesian) reflexes refer to the storms and cyclones associated with the wet in the southern tropical zone.

POc **apaRat* 'northwest wind; wet season when northwesterlies blow and sea is rough'

Adm: Mussau	<i>apae</i>	'strong wind, storm wind'
Adm: Wuvulu	<i>afā</i>	'northwest wind'

Adm: Drehet	<i>yaha</i>	‘stormy season, generally from November to March; strong wind and rough sea from the northwest’
NNG: Kove	<i>awaha</i>	‘rain’
NNG: Gitua	<i>yavara</i>	‘north wind’
NNG: Tami	<i>yawal</i>	‘northwest wind’
NNG: Kairiru	<i>yavar</i>	‘northwest wind, makes sea rough’
PT: Muyuw	<i>yavat</i>	‘west, west wind’
PT: Iduna	<i>yavalata</i>	‘rains with wind from the northwest in February and March’
PT: Tawala	<i>yawalata</i>	‘light rain from southwest during dry season’
PT: Motu	<i>lahara</i>	‘northwest wind, season of northwest wind’
MM: Bali	<i>vurata</i>	‘northwest wind’
MM: Nakanai	<i>le-avala</i>	‘year, wet season’
MM: Kara (East)	<i>yefet</i>	‘wet season’
MM: Barok	<i>awat</i>	‘year’
MM: Siar	<i>yahrat</i>	‘year’
MM: Tinputz	<i>ivat</i>	‘strong wind’
NCal: Nêlêmwa	<i>(w)āvac</i>	‘north wind’ (Lynch pers. comm.)
NCal: Pije	<i>(y)avec</i>	‘north wind’
NCal: Fwâi	<i>(y)avec</i>	‘north wind’
NCal: Nemi	<i>(y)avec, (y)aec</i>	‘north wind’
NCal: Jawe	<i>(y)aec</i>	‘north wind’
PCP <i>*avā</i> ‘storm, gale, hurricane’		
Fij: Wayan	<i>ḍavā</i>	‘storm, strong wind bringing rain’
Pn: Tongan	<i>afā</i>	‘hurricane, gale or very severe storm’
Pn: Niuean	<i>afā</i>	‘storm, hurricane, gale’
Pn: Samoan	<i>afā</i>	‘storm, hurricane’
Pn: Tokelauan	<i>afā</i>	‘storm, hurricane’
Pn: E Futunan	<i>afā</i>	‘storm, hurricane’
Pn: E Uvean	<i>afā</i>	‘storm, hurricane’
Pn: Rennellese	<i>ahā</i>	‘storm, hurricane’
Pn: W Futunan	<i>afā</i>	‘gale, storm winds, hurricane winds’
Pn: Tuamotuan	<i>āfā</i>	‘(storm) break forth violently’
Pn: Maori	<i>āfā</i>	‘storm, hurricane’

Related forms also occur in Southeast Solomonic and Micronesian languages, but all appear to be borrowed rather than directly inherited. The Southeast Solomonic forms below reflect a (non-existent) POc ***awaRosi* rather than **apaRat*. They are evidently the outcome of borrowing from a Western Oceanic language where POc final consonants were retained with paragogic **-i* (the only group of languages which satisfy this criterion today are the Suauc languages of the Papuan Tip, and they are geographically somewhat unlikely candidates for the source).

SES:	Arosi	<i>worosi</i>	‘northwest gale’
SES:	’Are’are	<i>awarosi</i>	‘the northwest wind’
SES:	Sa’a	<i>awalosi</i>	‘northwest wind’

The Micronesian forms are odd in two ways. Firstly, if sound correspondences are applied to infer their putative POc ancestor, the result is ***barat[a]*, a form which is certainly not POc, but which is consistent with an early borrowing from a WMP language, perhaps a Philippine language. Its initial **b-* and final **-t* reflect the corresponding phonemes of PMP **habaRat*. Certain Philippine languages also reflect PMP **habaRat-an* with the locative suffix **-an*, e.g. Cebuano *habagatan* ‘southwest’, and the suffix may be the source of the final *-a* of Trukic and Woleaian forms. Secondly, the forms mean ‘(northeast) trade wind’, not, as we might here expect, something like ‘southwest storm wind’:

Mic:	Ponapean	<i>(nan-)par</i>	‘tradewind season’
Mic:	Proto Trukic	<i>*parata</i>	‘tradewind’
Mic:	L. Mortlockese	<i>paras</i>	‘rain that comes in due to wind’
Mic:	Woleaian	<i>pazasa</i>	‘tradewind’

Blust (ACD) takes it that PMP **habaRat* ‘southwest monsoon season, wet season’ formed a pair with PMP **timuR*, implying that the latter referred to the northeast trades and the dry season. However, such a pairing seems to have arisen among the WMP languages of Indonesia, where reflexes of **habaRat* mean ‘west’ and of **timuR* ‘east’. In Philippine languages, where we might expect the PMP sense to be retained, reflexes of **timuR* refer to a south or east wind, but not a monsoonal wind. (The PMP term for northeast trades seems to have been **qamih-an*,⁸ lost when Austronesian speakers crossed into the southern hemisphere.) PMP **timuR* also has reflexes in Oceanic languages, and POc **timu(R)* seems to have meant ‘wind bringing light rain’. In Papuan Tip languages forms which appear to reflect **timu(R)* have undergone a curious semantic shift and now mean ‘island’ (Ch. 3, §2.2). Relevant data are listed below.

PMP **timuR* ‘south or east wind’ (Dempwolff 1938: ‘wind bringing rain’; Zorc 1994: ‘rain wind from southeast’)

WMP:	Belau	<i>ōiməs</i>	‘south wind’ (Josephs 1990)
WMP:	Tagalog	<i>tīmog</i>	‘south’
WMP:	Cebuano	<i>tīmug</i>	‘wind that hits Cebu from the east’ (Wolff 1972)
WMP:	Bilaan	<i>timul</i>	‘south’
WMP:	Malagasy	<i>a-tsimu</i>	‘south’
WMP:	Aceh	<i>timu</i>	‘east’
WMP:	Indonesian	<i>timur</i>	‘east’
WMP:	Sasak	<i>timuq</i>	‘east’
CMP:	Buru	<i>timo</i>	‘east’

⁸ Tsuchida (1976) reconstructs PAn **qamiS* ‘north wind’. Philippine reflexes indicate that the locative suffix **-an* had been appended in PMP, giving **qamih-an*, reflected in Isneg *amiyān* ‘monsoon wind’, Casiguran Dumagat *amian* ‘northeast wind’, Tagalog *amihan* ‘northeast wind’, Bikol *amihan* ‘northeast trade wind’, Maranao *amian* ‘northwest wind’.

POc **timu(R)* ‘wind bringing light rain’

NNG:	Takia	<i>tim</i>	‘wind’
NNG:	Ali	<i>tim</i>	‘dew’
PT:	Iduna	<i>himula</i>	‘island’
PT:	Dobu	<i>simula</i>	‘island’
PT:	Motu	<i>si-simu</i>	‘light shower’
MM:	Ramoaina	<i>timtim</i>	‘drizzle; of rain’
Pn:	Samoa	<i>timu</i>	‘be rainy, rain’
Pn:	Anutan	<i>timu</i>	‘light rain, drizzle’
Pn:	Tongan	<i>jimu-jimu</i>	‘heavy blowing, almost a hurricane’

In Fijian and Polynesian languages the reflexes of POc **raki* ‘southeast trades’ and **apaRat* ‘northwest wind’ listed above reflect shifts in meaning. In Fijian languages, reflexes of **raki* mean ‘weather’, whilst Polynesian reflexes point to PPn **laki* ‘southwesterly quadrant, southwest wind and weather associated with it’ (Biggs & Clark 1993), i.e. a shift from southeast to southwest. In both Fijian and Polynesian languages, reflexes of POc **apaRat* point to PCP **avā* ‘storm, gale, hurricane’.

The closest functional equivalents to POc **raki* and **apaRat* in PPn were evidently PPn **toŋa* ‘southeasterly quadrant, southeast wind’ and PPn **tokelau* ‘northwesterly quadrant, northwest winds’. Whereas the POc terms evidently referred prototypically to seasonal winds, the central meanings of the PPn terms seem to have been winds from a certain portion—apparently a quadrant—of the compass, as the reflexes below indicate and as Åkerblom (1968:52) has observed. In Rarotongan, for example, *toŋa* refers to winds from south-by-west to south-southeast (but prototypically to south), *tokerau* to winds from northwest-by-north to west-northwest (prototypically to northwest); in Pukapukan *toŋa* refers to winds from south-by-east to southeast-by-south (but prototypically to south-southeast), *tokelau* to winds from north to northwest (Lewis 1972:74–75). Åkerblom goes a step further and suggests that neither term refers specifically to the trade wind. However, he recognises that throughout Polynesia a feature of the meaning of each is the prevailing wind and that they are often used with reference to the southeast trades and to northwest storm winds.

The ancestry of PPn **toŋa* is unclear, and I return to this below. Data supporting its reconstruction are as follows:

PPn **toŋa* ‘southeasterly quadrant, southeast wind’

Pn:	Niuean	<i>toŋa</i>	‘south wind’
Pn:	Tongan	<i>toŋa</i>	(N) ‘south’, (V) ‘(wind) be south’
Pn:	E Uvean	<i>toŋa</i>	‘south wind’
Pn:	E Futuna	<i>toŋa</i>	‘south (wind)’
Pn:	Pukapukan	<i>toŋa</i>	‘south-southeast wind’ (Lewis 1972:75)
Pn:	Rennellese	<i>toŋa</i>	‘east’
Pn:	Samoa	<i>toŋa</i>	‘south wind’
Pn:	Tuvalu	<i>toŋa</i>	‘south’
Pn:	Tikopia	<i>toŋa</i>	‘east, east wind, trade wind; winter’
Pn:	W.Futunan	<i>toŋa</i>	‘south’
Pn:	Rapanui	<i>toŋa</i>	‘autumn, winter’
Pn:	Rarotongan	<i>toŋa</i>	‘one of the wind quarters, south or southerly’

Pn:	Rarotongan	<i>toŋa</i>	‘south wind’ (Lewis 1972:74)
Pn:	Mangareva	<i>toŋa</i>	‘south wind’
Pn:	Tahitian	<i>toʔa</i>	‘south wind’
Pn:	Maori	<i>toŋa</i>	‘south’
Pn:	Tuamotuan	<i>toŋa</i>	‘wind from southerly or easterly quarter’
Pn:	Hawaiian	<i>kona</i>	‘leeward (i.e. south or southwest)’

PPn **tokelau* ‘northwesterly quadrant, northwest winds’ reflects POc **tokalau(r)*, the precise denotation of which is unclear. It presumably did not mean ‘northwest wind’, as this was the meaning of POc **apaRat*. The glosses of its reflexes below suggest that it denoted a northerly, or perhaps northeasterly, wind.

POc **tokalau(r)* ‘(?) northerly wind’

Adm:	Baluan	<i>tolaw</i>	‘north wind’
Adm:	Nyindrou	<i>tolau</i>	‘north’
NNG:	Kairiru	<i>tolau</i>	‘non-seasonal south wind, makes sea rough’
NCV:	Paamese	<i>tōlau</i>	‘northeast wind’
NCV:	Atchin	<i>tola</i>	‘northwest wind’
NCV:	Nguna	<i>tokolau</i>	‘northwest wind’
NCV:	Namakir	<i>tokolo</i>	‘northwest wind’
Fij:	Wayan	<i>tokalau</i>	‘easterly wind’
Fij:	Bauan	<i>tokalau</i>	‘northeast wind; third of compass from N to roughly WSW’ (Neyret 1950)

PPn **tokelau* ‘northwesterly quadrant, northwest winds’ (Biggs & Clark 1993)

Pn:	Tongan	<i>tokelau</i>	‘north’
Pn:	E Futunan	<i>tokelau</i>	‘northerly wind’
Pn:	Pukapukan	<i>tokelau’ (iti)</i>	‘north wind (Lewis 1972:75)
		<i>tokelau’ (matua)</i>	‘northwest wind (Lewis 1972:75)
Pn:	Rennellese	<i>tokegau</i>	‘northwest wind’
Pn:	Samoa	<i>toʔelau</i>	‘trade wind from northeast to east-southeast’
Pn:	Tuvaluan	<i>tokelau</i>	‘north, northerly wind.’
Pn:	Takuu	<i>tokorau</i>	‘north, northerly wind’
Pn:	Sikaiana	<i>tokelau</i>	‘north’
Pn:	Luangiua	<i>koʔolau</i>	‘north’
Pn:	Tikopia	<i>tokerau</i>	‘north wind.’
Pn:	Rarotongan	<i>tokerau</i>	‘northwest wind’ (Lewis 1972:74)
Pn:	Hawaiian	<i>koʔolau</i>	‘windward (northeast) sides of Hawaiian islands.’
Pn:	Marquesan	<i>tokoʔau</i>	‘north or northwest wind’
Pn:	Anutan	<i>tokerau</i>	‘approximately north; northerly wind’

POc **tokalau(r)* ‘(?) northerly wind’ reflects two PMP morphemes, as Dempwolff (1938:134) observed. The first appears to be PMP **tekas* ‘come to rest in a place’ (ACD), the second PMP **lahud* ‘downriver, towards the sea’. It is not clear how the POc meaning is derived from the glosses of these morphemes, and probable that POc **toka-lau(r)* was a lexicalised unit.

POc may also have inherited a semantically related term **toŋa-laur*, reflected in the items below and apparently denoting a northwesterly wind.⁹

MM: Roviana	<i>toŋa-rauru</i>	‘wind from direction of Lauru (approx north to northwest)’
NCV: Mota	<i>toŋa-lau</i>	‘northwest wind’
NCV: Raga	<i>toŋa-lau</i>	‘wind from direction of Ambae, i.e. northwest wind’

This term seems to contain the morpheme **toŋa* (cf. PPn **toŋa* ‘southeasterly quadrant, southeast wind’ above), implying its existence in POc, even though its POc meaning remains unknown. It is perhaps also reflected in Gela *sau-toŋa* ‘north wind’, where *sau* reflects POc **sau* ‘breeze’. However, caution is necessary here: it is possible that the three terms above simply reflect a sporadic sound change in POc **tokalau(r)* ‘(?) northerly wind’.

Other terms relating to a major wind direction or a season and reconstructable in POc or one of its more immediate daughters all refer to the southeast trades, not to the storm winds. This probably reflects the fact that the POc homeland lay within the ITCZ during the SHS, when the winds of the rainy season are fairly unpredictable and sporadic. The southeast trade wind of the SHW, on the other hand, blows consistently, and the various terms presumably reflect its nuances or refer to various aspects of its activity.

POc **karak(a)* seems to have referred to a strong southeast trade wind. Some reflexes suggest ***karak*, but final voiced stops did not occur in POc. Some NNG reflexes imply a POc final vowel, but SES reflexes do not. Some of the SES reflexes lack an expected initial consonant (Gela *ɣ-*, Longgu, Lau, Kwaio *ʔ-*), and so does Woleaian (*x-*). However, the fact that these items have appropriate meanings and otherwise correspond formally suggests that they belong to this cognate set, even if the loss of the initial is unexplained.

POc **karak(a)* ‘(strong?) southeast trade’

NNG: Lukep	<i>karaka</i>	‘southeast trade’
NNG: Bing	<i>karag</i>	‘southeast trade, blows off the sea strongly in August and September’
NNG: Bilibil	<i>karag</i>	‘dry wind’
NNG: Gedaged	<i>kɪlag</i>	‘southeast trade’
NNG: Takia	<i>karag-arag</i>	‘a light southeast wind which appears as part of the initial development of the southeast trade in April’
PT: Gapapaiwa	<i>kara-karata</i>	‘east wind’
SES: Gela	<i>ara</i>	‘southeast wind’
SES: Talise	<i>ɣara-ɣara</i>	‘wind’
SES: Malango	<i>hara-hara</i>	‘wind’
SES: Birao	<i>hara-hara</i>	‘wind’
SES: Longgu	<i>ara</i>	‘a cool, pleasant wind from the southeast’
SES: Lau	<i>āra</i>	‘southeast trades, violent wind’
SES: Kwaio	<i>ala</i>	‘southeast wind’
Mic: Woleaian	<i>aʒa</i>	‘south wind’

⁹ Ramoaaina *tailaur* ‘wind from New Ireland direction’ (basically east) seems to reflect another compound, where the first morpheme may reflect POc **tasik* ‘sea, saltwater’.

Two other terms which apparently referred to the southeast trades are given below.

POc **marau* 'southeast trade wind'

NNG:	Kove	<i>marau</i>	'light wind from the sea'
NNG:	Bariai	<i>marau</i>	'wind'
NNG:	Bam	<i>marau(lo)</i>	'southeast trade'
MM:	Vitu	<i>marau</i>	'north wind'
SES:	'Are'are	<i>marāu</i>	'southeast trades'
SES:	Sa'a	<i>marāu</i>	'southeast trades'
SES:	Arosi	<i>marāu</i>	'southeast trades'

PNGOc **yawana* 'southerly wind'

NNG:	Bing	<i>yowan</i>	'wind, a cold easterly wind across the land which brings the rain'
NNG:	Takia	<i>yawan</i>	'a southerly wind associated with moderately heavy seas'
PT:	Iduna	<i>yawana</i>	'wind from the sea'
PT:	Tawala	<i>yawana</i>	'south wind, wind from the south'
PT:	Suau	<i>yawana</i>	'northwest monsoon'
PT:	Misima	<i>yavana</i>	'southerly wind'

One more term, **aqura*, seems to have served both as a generic wind term and as a term for the 'default' wind, the southeast trade:

POc **aqura* 'wind, possibly southeast trade'

Adm:	Nauna	<i>eul</i>	'wind' (ACD)
Adm:	Penchal	<i>aul</i>	'wind' (ACD)
Adm:	Lou	<i>our</i>	'wind'
Adm:	Pak	<i>ouh</i>	'wind' (ACD)
NNG:	Tuam	<i>yawur</i>	'wind'
NNG:	Mutu	<i>yagur</i>	'wind'
NNG:	Malai	<i>yagur</i>	'wind'
NNG:	Sio	<i>wǝʔa</i>	'northwest monsoon'
NNG:	Numbami	<i>aula</i>	'wind'
NNG:	Takia	<i>ur</i>	'air'
NNG:	Ali	<i>ur</i>	'wind'
PT:	Motu	<i>laura(bada)</i>	'southeast trade wind' (<i>bada</i> 'big')
SES:	Kwaio	<i>au</i>	'southeast wind, wind from sea'
Mic:	Kosraean	<i>εir</i>	'north'
Mic:	Ponapean	<i>(pali)eir</i>	'south'
Mic:	Carolinian	<i>ār</i>	'south'

The terms I have reconstructed above refer to wind directions and to seasons, sometimes prototypically to the wind, sometimes to the season. A further development is that one of the seasonal terms comes to mean 'year' (perhaps something like 'the annual round' would be more accurate). Relevant examples are repeated here, but this development also affects local seasonal/wind terms. Thus these items reflect POc **raki* 'southeast trades'—

NNG:	Kove	<i>hai</i>	‘southeast trade, year’
NNG:	Bariai	<i>rai</i>	‘year’
NNG:	Lukep	<i>rai</i>	‘year’
Mic:	Woleaian	<i>zaxi</i>	‘year, age, summer season’

—whilst the two below reflect POc **apaRat* ‘northwest wind’:

MM:	Barok	<i>awat</i>	‘year’
MM:	Siar	<i>yahrat</i>	‘year’

5 The weather

5.1 ‘calm’

Four reconstructions with the meaning ‘calm’ (as applied to the weather) are given below. The first two, **malino* and **[ma-[d]]rapu*, are reconstructed for POc (and earlier stages). The multiple bracketing of **[ma-[d]]rapu* does not reflect doubt about the reconstruction, but rather the fact that POc inherited several derivationally related forms: **rapu*, **ma-rapu*, **N-rapu*, **maN-rapu* (it is not clear in what measure these derivations were still productive in POc).

It is difficult to distinguish between the meanings of these two terms but the glosses for reflexes of **malino* imply an emphasis on tranquility, whereas those of **[ma-[d]]rapu* seem to refer to the stillness of the wind.

The cognate set below indicates that speakers of several daughter languages adopted one or other strategy to get rid of **-l-* and **-n-* in the onsets of consecutive syllables in POc **malino*. The two sounds entail different manners of articulation at the same point of articulation, but it is not clear to me why this should have led to the avoidance of the sequence.

PMP **linaw* ‘be clear’ (Dempwolff 1938)

POc **ma-lino* ‘calm’ (Grace 1969)

NNG:	Kove	<i>malilo</i>	‘calm’ (consonant assimilation)
NNG:	Atui	<i>mullil</i>	‘soft’ (consonant assimilation)
NNG:	Takia	<i>malin</i>	‘calm’
NNG:	Manam	<i>malino</i>	‘calm’
NNG:	Bam	<i>malin</i>	‘calm’
PT:	Balawaia	<i>maino</i>	‘calm’
PT:	Gabadi	<i>maino</i>	‘calm’
MM:	Vitu	<i>manilo</i>	‘calm’ (metathesis)
MM:	Nakanai	<i>malilo</i>	‘calm’ (consonant assimilation)
MM:	Lavongai	<i>malila</i>	‘calm’ (consonant assimilation)
MM:	Minigir	<i>malila</i>	‘calm’ (consonant assimilation)
MM:	Mono	<i>malilo</i>	‘calm’ (consonant assimilation)
Pn:	Samoan	<i>manino</i>	‘transparent, clear’ (consonant assimilation)
Pn:	Tongan	<i>melino</i>	‘at peace’
Pn:	Tuamotuan	<i>marino</i>	‘calm’

PMP **(d,r)apu* ‘still, calm, quiet’ (Blust 1972)

POc **[ma-[d]]rapu* ‘still, calm, windless’

Adm:	Nyindrou	<i>"ra-dah</i>	‘breeze’
MM:	Petats	<i>marah</i>	‘calm’
MM:	Haku	<i>maraha</i>	‘calm’
MM:	Taiof	<i>madav</i>	‘calm’
MM:	Teop	<i>mara</i>	‘calm’
Fij:	Bauan	<i>maravu</i>	(N) ‘a calm (at sea)’, (V, ADJ) ‘(sea) calm,’
Fij:	Wayan	<i>maravu</i>	‘(sea) calm, still, windless’

The other two forms, PEOc **ma-lua(s)* ‘soft, gentle, (weather) calm’ and PWOC **siwaRop/*niwaRop* ‘(weather) calm, peaceful’, are reconstructable as weather terms in lower-order protolanguages.

PEOc **ma-lua(s)* ‘soft, gentle, (weather) calm’ is descended from POc **ma-luas* ‘soft’, but only the Eastern Oceanic reflexes refer to the calmness—or perhaps more accurately the gentleness—of the weather.

POc **ma-luas* ‘soft’

MM:	Notsi	<i>məlus</i>	‘soft’
MM:	Konomala	<i>(ma)mlas</i>	‘soft’
MM:	Siar	<i>(ma)maluas</i>	‘soft’
MM:	Ramoaaina	<i>(mal)malua</i>	‘soft’
MM:	Nehan	<i>(mal)malua(n)</i>	‘soft’

PEOc **ma-lua(s)* ‘soft, gentle, (weather) calm’

SES:	Gela	<i>malua</i>	‘soft’
SES:	‘Are’are	<i>mārūrū</i>	‘soft, gentle, flexible’
Mic:	Ponapean	<i>malu-n</i>	‘calm, of the sea’
Mic:	Mokilese	<i>molu-n</i>	‘calm or fine, of weather’
Mic:	L. Mortlockese	<i>maləwa-ləw</i>	‘peaceful’
Mic:	Puluwatese	<i>malɨwa-lɨ</i>	‘to be easy or slow, to be calm (as the sea), to be gentle’
Fij:	Bauan	<i>mālua</i>	‘gently, slowly, quietly’

PWOC **siwaRop/*niwaRop* ‘calm, peaceful’ may well have expressed a nuance of ‘peace’. Again we have two derivationally related forms, the first the base, the second the base prefixed by PMP **N-* (originally ‘antipassive’) or perhaps PMP **⟨in⟩/ni-* ‘perfective, perfective nominaliser’.

PWOC **siwaRop, *niwaRop* ‘(weather) calm, peaceful’

PT:	Dobu	<i>siwalowa</i>	‘calm’
PT:	Molima	<i>hiwalova, niwalova</i>	‘calm’
PT:	Iduna	<i>niwalova</i>	‘stillness, season without wind, calm, peace (no fighting)’
PT:	Are	<i>niworoa</i>	‘calm’
PT:	Kiriwina	<i>niwal</i>	‘calm’
PT:	Taboro	<i>(a)siure-ure</i>	‘calm’

MM:	Sursurunga	<i>siaroh</i>	‘peaceful (as waves), calm’
MM:	Siar	<i>siarof</i>	‘calm’
MM:	Solos	<i>sianoh</i>	‘calm’
MM:	Selau	<i>sarowo</i>	‘calm’
MM:	Teop	<i>hiarovo</i>	‘good weather after a rain’

5.2 The sky and clouds

The locus of much of the weather was of course POc **lanit*, the sky, and there are a few signs that this word also had something of the sense of English ‘weather’, in some languages coming to refer to a particular form of weather. The sky was also very important in the context of navigation (p.157). POc **lanit* was also used as a local noun meaning ‘up above’ (p.235).

PMP **lanit* ‘sky’ (Dempwolff 1938)

PMP **lanit* ‘sky’

POc **lanit* ‘sky, weather’

Adm:	Tench	<i>raniti</i>	‘rain’
Adm:	Titan	<i>lan</i>	‘sky; heaven’
NNG:	Malalamai	<i>lan</i>	‘cloud’
NNG:	Buang	<i>yagk</i>	‘sky’
NNG:	Manam	<i>lan</i>	‘sky, heavens’
NNG:	Kaiep	<i>lanit</i>	‘thunder’
MM:	Bali	<i>laniti</i>	‘sky’
MM:	Tigak	<i>lanit</i>	‘rain’
MM:	Tabar	<i>raniti</i>	‘sky’
MM:	Siar	<i>lanit</i>	‘sky’
MM:	Nehan	<i>lanit</i>	‘sky’
MM:	Haku	<i>lanic</i>	‘rain; sky’
MM:	Alu	<i>laiti</i>	‘rain’
SES:	Kwaio	<i>lanji</i>	‘sky, heavens’
SES:	Arosi	<i>ranji</i>	‘rain’
NCV:	Raga	<i>lanji</i>	‘wind’
NCV:	Paamese	<i>alan</i>	‘wind’
NCV:	Lewo	<i>lanji</i>	‘wind’
Mic:	Marshallese	<i>lan</i>	‘sky, heavens’
Mic:	Woleaian	<i>ranji</i>	‘sky; typhoon, rainstorm, wind’
Fij:	Bauan	<i>(vū-ni)-lanji</i>	‘horizon’ (lit. ‘base of sky’)
		<i>(lewe-ni)-lanji</i>	‘full moon’ (lit. ‘flesh of sky’)
Pn:	Tongan	<i>lanji</i>	‘sky, heavens’
Pn:	Samoa	<i>lanji</i>	‘sky, heavens’

PNGOc **sabam* ‘sky’ is also reconstructable. It is not clear how this contrasted with **lanit*.

PNGOc **sabam* ‘sky’

NNG:	Malai	<i>sabam</i>	‘sky’
NNG:	Sio	<i>saba</i>	‘sky’
NNG:	Bing	<i>sɔm</i>	‘sky’
NNG:	Dami	<i>sa</i>	‘sky’
NNG:	Bilibil	<i>sabat</i>	‘sky’
PT:	Ubir	<i>safam</i>	‘sky’
PT:	Are	<i>sapama</i>	‘sky’
PT:	Bwaidoga	<i>yabama</i>	‘sky’
PT:	Kiriwina	<i>labuma</i>	‘sky’

The generic term for ‘cloud’ in POc was **qaRoq*.

POc **qaRoq* ‘cloud (generic)’

PT:	Dobu	<i>yaloa</i>	‘cloud’
PT:	Kwato Suau	<i>yalo</i>	‘cloud’
PT:	Misima	<i>yalu-yalu</i>	‘cloud’
MM:	Maringe	<i>maloa</i>	‘sky’
SES:	Bugotu	<i>(ma)alo(a)</i>	‘sky’
SES:	Lau	<i>salo</i>	‘sky’
SES:	Kwaio	<i>lalo</i>	‘sky’
SES:	Sa’a	<i>(mei)salo</i>	‘cloud’
SES:	Arosi	<i>aro</i>	‘sky’
Fij:	Bauan	<i>ō</i>	‘cloud’
Fij:	Wayan	<i>(ka)ō</i>	‘cloud’
Pn:	Tongan	<i>ʔao</i>	‘cloud(s)’
Pn:	Samoa	<i>ao</i>	‘cloud’
Pn:	Hawaiian	<i>ao</i>	‘any kind of cloud’

The four terms below each possibly denoted a type of cloud. POc **rodo(η)* meant ‘rain cloud’. PNGOc **guba(r,R)* may have denoted a storm cloud, but it is impossible to attribute more exact meanings to POc **ulu* or POc **bala*.

PMP **rendey* ‘wet season’ (ACD)

POc **rodo(η)* ‘rain cloud’

SES:	Talise	<i>ro-rodo</i>	‘cloud’
SES:	’Are’are	<i>roto</i>	‘cloudy, black cloud, squall’
SES:	Arosi	<i>ro-rodo</i>	‘a cloud’
NCV:	Fortsenal	<i>koko</i>	‘rain cloud’
NCV:	Raga	<i>dodo</i>	‘rain cloud’

PNGOc **guba(r,R)* ‘k.o. cloud (possibly storm cloud)’

NNG:	Mangap	<i>gubur</i>	‘dark cloud’
NNG:	Sepa	<i>kuba</i>	‘rain’
PT:	Are	<i>guba</i>	‘cloud’

PT:	Gapapaiwa	<i>guva</i>	‘cloud’
PT:	Maopa	<i>kupa</i>	‘rain’
PT:	Motu	<i>guba</i>	‘sky; heavens; a northwest squall’
PT:	Gabadi	<i>upa</i>	‘rain’
PT:	Mekeo	<i>ufa</i>	‘sky, heavens’

POc **ulu* ‘k.o. cloud’

NNG:	Uvol	<i>ulu</i>	‘cloud’
MM:	Lavongai	<i>ulu-l</i>	‘fog’
SES:	’Are’are	<i>uru</i>	‘cloud, heaven, sky, top’
SES:	Arosi	<i>uru</i>	‘white clouds’
		<i>uru-uru</i>	‘black rainclouds’
		<i>(bara)uru</i>	‘evening bank of clouds; heavy masses of dark clouds’

POc **bala* ‘k.o. cloud’

Adm:	Titan	<i>pala</i>	‘cloud, light white clouds’
MM:	Tabar	<i>bara-bara</i>	‘cloud’
MM:	Lihir	<i>(lo)bal-bal</i>	‘cloud’
MM:	Tangga	<i>bal-bal</i>	‘cloud’
SES:	Arosi	<i>bara(uru)</i>	‘evening bank of clouds; heavy masses of dark clouds’

There are a number of reconstructable POc terms some of whose reflexes mean ‘cloud’, others ‘mist’ or ‘fog’. and yet others have both meanings. It seems reasonable to infer that a mist was conceived as a cloud at sea—or ground—level.

PMP **Ra(m)bun* ‘haze’ (Blust 1972)POc **Rapu(n)* ‘haze, mist’

Adm:	Drehet	<i>kxɔ-kxɔh</i>	‘cloud’
NNG:	Bariai	<i>lau-lau</i>	‘cloud’
PT:	Kiriwina	<i>loa-lova</i>	‘cloud’
SES:	Bugotu	<i>lavo</i>	‘haze, vapour; misty, hazy’
SES:	Lengo	<i>lavo</i>	‘fog’
SES:	Longgu	<i>lavo</i>	‘fog’
SES:	Lau	<i>lafo</i>	‘cloud’
SES:	Kwaio	<i>lafo</i>	‘cloud’
SES:	’Are’are	<i>raho</i>	‘haze, mist, fog, cloud’

Proto North/Central Vanuatu **ma-Ravu* ‘fog, mist’ (Clark 1996)

NCV:	Mota	<i>marav</i>	‘dim, misty’
NCV:	Raga	<i>marav</i>	‘mist’
NCV:	Paamese	<i>mahu-mahu</i>	‘cloud’
NCV:	Nguna	<i>(na)mavu</i>	‘fog, mist’

The meanings of the set below are intriguing: their common denominator seems to be misty rain which gives rise to a rainbow if the sun’s rays are refracted through it, but this gloss is somewhat speculative.

POc **b^wa(p)o* '(?) misty rain'

Adm:	Mussau	<i>bao</i>	'rain'
SJ:	Kayupulau	<i>b^wau</i>	'cloud'
SJ:	Ormu	<i>wawu</i>	'cloud'
PT:	Iduna	<i>bowa</i>	'rainbow'
PT:	Kiriwina	<i>b^wab^wau</i>	'rain clouds'
PT:	Sudest	<i>b^wao</i>	'rainbow'
SES:	Lau	<i>k^wafo</i>	'mist, cloud'
SES:	Kwaio	<i>g^wafo</i>	'mist'

The items below—POc **kapu(t)*/**kopu* 'low cloud, mist, fog' and POc **gapu(l)* 'mist'—are intriguing because of their formal similarity to each other. It is eminently likely that **gapu(l)* is derivationally related to **kapu(t)*. If we ignore their putative final consonants, the former appears to be derived from **N + kapu* (see vol. 1, pp.29–30). But the final **-t* of **kapu(t)* is attested by non-Oceanic witnesses, the final **-l* of **gapu(l)* by its Minigir and Tolai reflexes, and I cannot see a way of resolving this conflict.

PMP **kabut* 'mist' (Dempwolff 1938)

POc **kapu(t)* 'low cloud, mist, fog'

Adm:	Titan	<i>aúu</i>	'low lying clouds, mist, not raining'
NNG:	Takia	<i>kau-kau</i>	'fog'
NNG:	Kairiru	<i>qafu-f</i>	'fog'
NNG:	Kove	<i>yau-yau</i>	'misty'
PT:	Motu	<i>yahu</i>	'mist; fog at sea; haze'
PT:	Roro	<i>abu</i>	'fog'
PT:	Mekeo	<i>apu, apu-apu</i>	'fog, cloud'
MM:	Kara (West)	<i>kauf</i>	'fog'
SES:	Talise	<i>yavu</i>	'fog'

The Bali and Fijian forms below are problematic, as they reflect POc **kabu(t)*, not **kapu(t)*

MM:	Vitu	<i>yabu-yabu</i>	'fog'
Fij:	Bauan	<i>kabu</i>	'mist'
Fij:	Wayan	<i>kabu</i>	(N) 'mist, haze, fog'; (V) 'be covered in cloud, mist, fog'

It seems likely that **kopu* already occurred in POc as a doublet of **kapu(t)* resulting from assimilation of the rounding feature of the second vowel to that of the first. Such a change was once productive in both Rotuman and Tongan (Andrew Pawley, pers. comm.).

POc **kopu* 'low cloud, mist, fog'

Adm:	Lou	<i>kəp-kəp</i>	'dust; fog, mist'
Adm:	Drehet	<i>kop^w(ieh)</i>	'mist, fog'
PT:	Molima	<i>k^wau</i>	'cloud'
MM:	Mono	<i>(ma)kohu</i>	'fog'
MM:	Laghu	<i>kō</i>	'fog'
SES:	Bauro	<i>k^wahu</i>	'fog'
NCV:	Raga	<i>govu</i>	'clouded'

Fij:	Bauan	<i>govu</i>	‘light clouds covering land’
Pn:	Mangareva	<i>kou</i>	‘clouds low on the peaks of the hills’
Pn:	Tahitian	<i>ohu</i>	‘cloud settled on the mountain tops’
Pn:	Marquesan	<i>kohu</i>	‘fog, haze’

POc **gapu(l)* ‘mist’

NNG:	Malai	<i>gafu-f</i>	‘fog’
NNG:	Amara	<i>(a)gau-gau</i>	‘fog’
NNG:	Arove	<i>gau-gau</i>	‘fog’
PT:	Tawala	<i>gahu</i>	‘fog’
MM:	Minigir	<i>gavulu</i>	‘cloud’
MM:	Tolai	<i>gavul</i>	‘fog, mist’
SES:	Gela	<i>gavu</i>	‘mist, haze’
SES:	Kwara’ae	<i>goh</i>	‘fog’
SES:	Langalanga	<i>gafu</i>	‘fog’
SES:	Arosi	<i>gahu</i>	‘mist, be misty’
Pn:	Tongan	<i>ka-kapu</i>	‘mist’

As if this were not already complicated enough, a further curiosity is the reconstruction of Proto Nuclear Polynesian **kapuqa* ‘cloud’ (Biggs & Clark 1993), which either entails the addition of **-qa* to a reflex of POc **kapu(t)* or **gapu(l)* or is a derivative of the PPn verb **kaputi* ‘cover over’.

Proto Nuclear Polynesian **kapuqa* ‘cloud’

Pn:	Rapanui	<i>kapuʔa</i>	‘fog, haze, mist’
Pn:	Hawaiian	<i>ʔōpua</i>	‘puffy clouds, as banked up near the horizon’
Pn:	Kʻmaringi	<i>gabua</i>	‘raincloud (sign of rain)’
Pn:	Maori	<i>kapua</i>	‘cloud, mist’
Pn:	Rarotongan	<i>kāpua</i>	‘cloud, mist’

5.3 Rain

The most widely reflected POc word for ‘rain’ (both verb and noun) is **qusan*. Also reconstructable are POc **[ka]dapuR* ‘rain, rain cloud’ and PWOC **(rR)ugu* ‘rain’. It is not known if **(rR)ugu* differed in meaning from **qusan*, but **[ka]dapuR* seems to have referred both to a rain cloud and to the rain it deposits.

PAn **quZaL* ‘rain’ (Blust 1969, Dempwolff 1938)PMP **quZan* ‘rain’POc **qusan* ‘(N, V) rain’

NNG:	Malasanga	<i>kuya</i>	‘rain’
NNG:	Poeng	<i>kue</i>	‘rain’
NNG:	Takia	<i>ui</i>	‘rain’
NNG:	Numbami	<i>usana</i>	‘rain’
NNG:	Kaiwa	<i>ur</i>	‘rain’
NNG:	Manam	<i>ura</i>	‘rain’
PT:	Are	<i>kusana</i>	‘rain’

PT:	Balawaia	<i>yura</i>	‘rain’
MM:	Bali	<i>yuzana</i>	‘rain’
MM:	Lihir	<i>uos</i>	‘rain’
MM:	Teop	<i>huan</i>	‘rain’ (metathesis)
MM:	Maringe	<i>(na)uha</i>	‘rain’
SES:	Bugotu	<i>uha</i>	‘rain’
SES:	Longgu	<i>uta</i>	‘rain’
SES:	Lau	<i>uta</i>	‘rain’
NCV:	Fortsenal	<i>usa</i>	‘rain’
Mic:	Woleaian	<i>uta</i>	‘rain’
Fij:	Bauan	<i>uða</i>	‘rain’
Pn:	Tongan	<i>ʔuha</i>	‘rain.’
Pn:	Samoan	<i>ua</i>	‘rain’

POc **[ka]dapuR* ‘rain, rain cloud’

Adm:	Loniu	<i>kaʔæh</i>	‘cloud’
Adm:	Lele	<i>kanrah</i>	‘cloud’
MM:	Bulu	<i>kadavu</i>	‘rain’
MM:	Meramera	<i>adavu</i>	‘rain’
MM:	Kara (East)	<i>rafui</i>	‘rain’
MM:	Nalik	<i>dafur</i>	‘rain’
MM:	Konomala	<i>daf</i>	‘rain’
MM:	Banoni	<i>ɣarau</i>	‘rain’
MM:	Piva	<i>ɣaravu</i>	‘rain’
Mic:	Kiribati	<i>karau</i>	‘rain, heaven, sky’
Mic:	Kosraean	<i>kaʃao</i>	‘sky, heaven’
Mic:	Marshallese	<i>keɾaw</i>	‘cloud, overcast’
Mic:	Ponapean	<i>keɟew</i>	‘rain, to rain’
Mic:	Mokilese	<i>kɔsɔw</i>	‘cloud’
Mic:	Chuukese	<i>kuɟũ-</i>	‘cloud’
Mic:	Puluwatese	<i>worow</i>	‘white cloud’
Mic:	Carolinian	<i>uʃow</i>	‘rain’
Mic:	Woleaian	<i>xoʃou</i>	‘rain’

PWoc **(rR)ugu* ‘rain’

NNG:	Aria	<i>rugu</i>	‘rain’
NNG:	Mangga Buang	<i>ruq</i>	‘rain’
NNG:	Kumarumumeng	<i>ruk</i>	‘rain’
MM:	Roviana	<i>ruku</i>	‘rain’
MM:	Hoava	<i>ruku</i>	‘rain’

A semantically related term was POc **bata*, which, to judge from a constellation of Meso-Melanesian and Polynesian reflexes, probably meant ‘raindrop’. However, a number of Western Oceanic languages also agree on the meaning ‘cloud’.

POc **bata* '(?) raindrop, (?) rain cloud'

NNG:	Apalik	(e)vat	'cloud'
NNG:	Atui	vat	'cloud, sky'
NNG:	Akolet	(e)wat	'cloud'
MM:	Kara (West)	bata	'cloud'
MM:	Tabar	bata	'rain'
MM:	Sursurunga	bət	'sky; cloud'
MM:	Tolai	bata	'rain, to rain'
MM:	Siar	bat	'rain'

PPn **pata* 'raindrop'

Pn:	Niuean	pata	'raindrop'
Pn:	Hawaiian	paka	'raindrop'
Pn:	Maori	pata	'raindrop'
Pn:	Marquesan	pata	'raindrop'

POc **d(r)im(a)-d(r)im(a)* evidently meant 'drizzle, light rain'. I have yet to find a reflex which allows me to diagnose whether the initial consonant was POc **d* or **dr*.

POc **d(r)im(a)-d(r)im(a)* 'drizzle, light rain'

Adm:	Lou	rim-rim	'light rain'
PT:	Iduna	dima-dima	'drizzle, rain of small drops that takes a long time to stop'
MM:	Tolai	ri-rimi	'drizzling rain'
MM:	Ramoaina	rim-rim	'drizzle, sprinkle'

In search of other terms associated in one way or another with rain, I tried to reconstruct terms for 'rainbow' and 'dew'. However, I could only reconstruct a Proto Eastern Oceanic term for the former (but see the note on POc **b^wa(p)o* 'misty rain (?)' above, p.145).

PEOc **nua-nua* 'rainbow'

NCV:	Mota	nunua	'change colour'
NCV:	Araki	nuenue	'rainbow'
NCV:	Tamambo	nuenue	'rainbow'
Pn:	E Futunan	nuanua	'rainbow'
Pn:	E Uvean	nuanua	'rainbow'
Pn:	Pukapukan	nuanua	'rainbow'
Pn:	Tuvalu	nuanua	'rainbow'
Pn:	Samoan	nuanua	'rainbow'
Pn:	Tokelauan	nuanua	'rainbow'
Pn:	Tahitian	(ā)nuanua	'rainbow'
Pn:	Maori	(ā)niwaniwa	'rainbow'
Pn:	Tuamotuan	(a)nuanua	'rainbow'
Pn:	Hawaiian	(ā)nuenue	'rainbow'
Pn:	Marquesan	(ā)nuanua	'rainbow'

For 'dew', a few reflexes of a PMP term occur.

PMP **lamuR* ‘dew’ (Dempwolff 1938)

POc **lamuR* ‘dew’

PT:	Iduna	<i>numura</i>	‘dew’
PT:	Kiriwina	<i>numla</i>	‘fog’
PT:	Lala	<i>lamu</i>	‘dew’
PT:	Balawaia	<i>amo</i>	‘dew’

5.4 Thunder and lightning

I have reconstructed five separate terms for ‘lightning’. POc **qu(s,j)ila(k)* seems to be the generic term for lightning, inherited from Proto Malayo-Polynesian. The glosses of reflexes of PNGOc **lamaR* imply that this item may have referred to lightning and thunder together. The other three reconstructions are **pilak* ‘lightning’, **pitik* ‘lightning’, **lap^(w)a(r,R)* ‘lightning, phosphorescence’. Whilst these may have referred to different kinds of lightning (e.g. sheet and forked) it is also possible that they were descriptive or metaphorical terms. It is reasonably clear, for example, that PNNG **kila(m,p)* ‘lightning’ was a reflex of PMP **kila(p,b)* ‘flash, sparkle’, (and that POc **qu(s,j)ila(k)* ‘lightning’ reflects PMP **silak* ‘beam of light’; cf. Dempwolff 1938:153).

PMP **qusilak* ‘lightning’ (Ross 1988)

POc **qu(s,j)ila(k)* ‘lightning’

Adm:	Nauna	<i>kocil</i>	‘lightning’
Adm:	Seimat	<i>usil</i>	‘lightning’
NNG:	Malalamai	<i>uzila</i>	‘lightning’
NNG:	Tami	<i>kujil</i>	‘lightning’
NNG:	Yabem	<i>osi?</i>	‘lightning’
NNG:	Bukawa	<i>si?</i>	‘lightning’
Pn:	Tongan	<i>ʔuhila</i>	(N) ‘lightning’
Pn:	E Uvean	<i>ʔuhila</i>	(N) ‘lightning’
Pn:	Samoa	<i>uila</i>	(N) ‘lightning’

PMP **bilak* ‘lightning’ (Dempwolff 1925)

POc **p^(w)ilak* ‘lightning’

NNG:	Kove	<i>pelaka</i>	‘lightning’ (final consonant retained: borrowing from Bali?)
NNG:	Bariai	<i>pir</i>	‘thunder’
NNG:	Mangap	<i>bil</i>	‘flash, lightning’
NNG:	Dami	<i>fili</i>	(V) ‘lightning’
NNG:	Medebur	<i>vilik</i>	‘lightning’
MM:	Bola	<i>vila</i>	‘lightning’
MM:	Nalik	<i>uilak</i>	‘lightning’
MM:	Sursurunga	<i>pil</i>	‘lightning’
MM:	Nehan	<i>pil</i>	‘thunder’
MM:	Solos	<i>pina</i>	‘thunder’
MM:	Teop	<i>pira</i>	‘thunder’

MM:	Banoni	<i>pina</i>	‘lightning’
MM:	Maringe	<i>fila</i>	‘thunder’
SES:	Talise	<i>(pila)pila</i>	‘lightning’
SES:	Longgu	<i>pila(ðia)</i>	(N, V) ‘lightning’
SES:	Arosi	<i>hira(ia)</i>	‘lightning’
NCV:	Mota	<i>vila</i>	‘lightning’
NCV:	Raga	<i>vilehi</i>	‘lightning’
NCV:	Paamese	<i>(a)hile</i>	‘lightning’
NCV:	Nguna	<i>(na)vila</i>	‘lightning’

PCEMP **pitik* ‘lightning’

CMP:	Selaru	<i>hitik</i>	‘lightning’ (Coward)
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POc **pitik* ‘lightning’

NNG:	Manam	<i>pitik(awa)</i>	‘lightning’
NNG:	Wogeo	<i>fitik</i>	‘lightning’
SES:	Gela	<i>viti</i>	‘lightning’
SES:	Malango	<i>vitih(i-a)</i>	(V) ‘lightning’

POc **lap^(w)a(r,R)* ‘lightning, phosphorescence’

NNG:	Sengseng	<i>(pe)lap</i>	‘lightning’
MM:	Tigak	<i>lapak</i>	‘lightning’
MM:	Kara (West)	<i>lapai</i>	‘lightning’
MM:	Tomoip	<i>lap</i>	‘thunder’
MM:	Haku	<i>(ka)naha</i>	‘lightning’
MM:	Torau	<i>(si)nava</i>	‘lightning’
MM:	Mono	<i>(ilai)laha</i>	‘lightning’
Pn:	Pileni	<i>lapa</i>	‘deep phosphorescent light, distinct from surface phosphorescence, occurring at a depth of from about 1 to 6 feet’ (Lewis 1972:208)
Pn:	Niuean	<i>lapa(sia)</i>	‘dazzled by the sun.’
Pn:	Tokelauan	<i>lapa</i>	‘flash of lightning’

Despite the formal variations in the cognate set above, its members are regular reflexes.

PNGOc **lamaR* ‘lightning’

NNG:	Malalamai	<i>lem</i>	‘lightning’
NNG:	Manam	<i>lama-lama</i>	‘thunder’
PT:	Molima	<i>namala</i>	‘lightning’
PT:	Tawala	<i>nama-namala</i>	‘lightning, bright, glitter’
PT:	Misima	<i>(pi)namal</i>	‘lightning’
PT:	Kwato Suau	<i>nama-namali</i>	‘lightning’
PT:	Hula	<i>rama-rama</i>	‘lightning’

PMP **kila(p,b)* ‘flash, sparkle’ (Dempwolff 1925, ACD)

POc **kilap* ‘flash, sparkle’

PNNG **kila(m,p)* ‘lightning’

NNG:	Gitua	<i>kila-kila</i>	‘lightning’
NNG:	Lukep	<i>kili</i>	‘lightning’
NNG:	Poeng	<i>kilama</i>	‘lightning’
NNG:	Roinji	<i>kirap</i>	‘thunder’
NNG:	Bing	<i>kin</i>	‘lightning’
NNG:	Takia	<i>-ki-kilawi</i>	‘thunder and lightning’
Pn:	Samoan	<i>ʔi-ʔila</i>	‘(of reflected light) shine, glisten, sparkle, twinkle’

POc appears to have had two basic roots for thunder, **kuru* and **p^waraq*, both of which occur in apparent fossilised morphological variants. Firstly, alongside **kuru* we find **guru*. The latter may represent **N + kuru*. Secondly, alongside **kuru*, **guru* and **p^waraq* we find forms with reduplication of the second syllable: **kururu*, **gururu* and **p^wararaq*. This was not to my knowledge a widespread process in POc, and I take its appearance here to be associated with the onomatopaeic nature of the etyma. Thirdly, it seems that the foregoing forms were (at least sometimes) verbal, and we find apparent nominalisations: **guru-ŋ(a)*, **gururu-ŋ(a)*, and **para-ŋ(a)*.

PMP **guruq* ‘noise, tumult’ (ACD)

POc **kuru*, **kururu* ‘thunder’

NNG:	Kove	<i>ku-kururu</i>	‘thunder’
MM:	Bola	<i>kururu</i>	‘thunder’
SES:	Lau	<i>kururu</i>	‘thunder’
SES:	Arosi	<i>(a)kuru</i>	(N, V) ‘thunder’
SES:	Kahua	<i>(yu)yuru(hia)</i>	‘thunder’
Fij:	Bauan	<i>kuru</i>	(N, V) ‘thunder’
Fij:	Wayan	<i>kuru-kuru</i>	(N, V) ‘thunder’

PMP **guruq* ‘noise, tumult’ (ACD)

POc **guru*, **gururu* ‘thunder, make loud noise’

Adm:	Drehet	<i>kuruh</i>	‘thunder’
NNG:	Takia	<i>-gurur</i>	‘noise rumbling, thunder, crackling’
NNG:	Buang	<i>klu</i>	‘roar, thunder, explode; like falling or running water, – like a waterfall, or thunder’
NNG:	Sukurum	<i>(mu)^ŋkuru</i>	‘thunder’
NNG:	Ulau-Suain	<i>gururu</i>	‘thunder’
PT:	Misima	<i>gulu(m^wawa)</i>	‘thunder’
PT:	Motu	<i>guru</i>	‘noise, clamour’
PT:	Balawaia	<i>yulu</i>	‘loud noise’
PT:	Lala	<i>ulu</i>	‘thunder’
MM:	Ramoaina	<i>(pa)guru</i>	‘(thunder, wind in stomach) make a rumbling noise’
MM:	Teop	<i>guru</i>	‘thunder’

MM:	Haku	<i>gururu</i>	‘it thunders’
MM:	Tinputz	<i>guguruh</i>	(V) ‘thunder’
MM:	Maringe	<i>gu-gulu</i>	‘thunder’
SES:	Gela	<i>guru</i>	‘(thunder) rumble’
SES:	Lengo	<i>gururu</i>	‘thunder’
SES:	Arosi	<i>guru-guru</i>	‘thunder’

POc **guru-η(a)*, **gururu-η(a)*, **gururu-aj* ‘thunder’

NNG:	Gitua	<i>gururun</i>	‘thunder’
NNG:	Sengseng	<i>kulu-η</i>	‘thunder’
NNG:	Avau	<i>run-run</i>	‘thunder’
NNG:	Akolet	<i>ηu-grun</i>	‘thunder’
NNG:	Bebeli	<i>gu-gurun</i>	‘thunder’
NNG:	Uvol	<i>kurun</i>	‘thunder’
MM:	Tigak	<i>gun</i>	‘thunder’
SES:	Longgu	<i>gururua</i>	‘thunder, small thunder, clap of thunder heard in the late afternoon when you get late afternoon rain; a storm’

POc **p^waraq*, **p^wararaq* ‘thunder’

NNG:	Gitua	<i>palaki</i>	‘thunder’
PT:	Gumawana	<i>(lo)pala-pala</i>	(V) ‘thunder’
PT:	Ubir	<i>(wa)ferer</i>	‘loud thunder’
PT:	Tawala	<i>palele</i>	‘thunder’
PT:	Muyuw	<i>pala-pal</i>	‘thunder’
MM:	Kara (East)	<i>(va)barak</i>	‘thunder’
MM:	Notsi	<i>pal-pallek</i>	‘thunder’
MM:	Tabar	<i>para-para</i>	‘thunder’
MM:	Lihir	<i>palal</i>	‘thunder’
MM:	Sursurunga	<i>pər</i>	‘thunder’
MM:	Patpatar	<i>par-parara</i>	‘thunder’
SES:	Arosi	<i>p^wararā</i>	‘thunder’
Mic:	Kiribati	<i>pā</i>	‘thunder’
Mic:	Kosraean	<i>pʌlæɫ</i>	‘thunder’
Mic:	Mokilese	<i>palār</i>	‘thunder’
Mic:	Puluwatese	<i>paçç</i>	‘thunder’
Mic:	Carolinian	<i>paçç</i>	‘thunder’

POc **para-η(a)* ‘thunder’

Adm:	Mussau	<i>pala-palaŋa</i>	‘thunder’
Adm:	Drehet	<i>palan</i>	‘thunder accompanied by lightning’

6 Concluding remarks

It may seem to the reader that I have turned the *Wörter und Sachen* technique on its head. That is, instead of using reconstructed items to determine something of the culture and environment of POc speakers, I have used climatic information based on a hypothesis

about Austronesian speakers' directions of dispersal and about the location of the POc speech community to set up a hypothesised structure for a POc meteorological terminology, and then set out to fill in its semantic categories. This is a variation on the method of terminological reconstruction used in other contributions to this work. I have deliberately chosen to establish semantic categories on the basis of climatic information rather than of the terminologies of present-day languages because of the variation in these terminologies from one location to another due to climatic differences.

The final step in the method of terminological reconstruction is to examine the hypothesised terminology to see if it needs modification in the light of the reconstructions which have been made. If POc reconstructions can be made for unpredicted items (say for hurricanes and cyclones), or POc reconstructions cannot be made for expected terms, then we must re-examine the initial hypothesis.

Meteorological terms (PAn **baRiuS* 'typhoon' and **qamiS(-an)* 'north, cold season') are among those that have been used as supporting evidence to locate the Proto Austronesian homeland (Blust 1984–85, Pawley & Ross 1993). In the present case, I have been able to reconstruct the POc terms I expected on the hypothesis that the POc speech community was located in the Bismarck Archipelago (except 'rainbow') and have not found that the data forced me to reconstruct unpredicted meteorological terms. So we can say that the hypothesis that POc was spoken in the Bismarck Archipelago has not been disconfirmed by this study.