Mesoamerican linguistic contacts: 
the data from Huave borrowings

Rolf NOYER
University of Pennsylvania
rnoyer@ling.upenn.edu

1. Introduction

The Huavean family, generally considered a genetic isolate, is currently spoken in four distinct dialects/languages in four communities surrounding a large lagoon on the Pacific coast of the Isthmus of Tehuantepec in the state of Oaxaca, Mexico: San Francisco del Mar (F), Santa María del Mar (MA), San Dionisio del Mar (D), and San Mateo del Mar (Mo). Belmar (1901), in a detailed study of MA, proposed a genetic relationship between Huave and the Mayan languages, but Radin (1916), based on field work on D, rejected the link to Mayan, proposing instead that Huave belonged to the Mixe-Zoquean family. Aside from mostly vague typological parallels and a few morphological commonalities, both authors relied on lexical resemblances, which were striking and numerous enough to permit a somewhat plausible hypothesis of genetic relatedness.

Suárez (1975) then offered a detailed reconstruction of Proto-Huave (PH), convincingly establishing that no external genetic relationships could be demonstrated. Since that time no further work on comparative Huavean has been published, although quite a number of descriptive materials and grammatical studies have become available, most importantly a grammar and dictionary of Mo (Stairs & Stairs 1981) and a dissertation on the phonology and morphology of F (Kim 2008). Also in recent years descriptive work has resumed (after a century of neglect) for the other two dialects, D and MA. With this large body of
new data, along with Radin’s unpublished field notes, the present author has compiled a large comparative and etymological dictionary of Huavean (Noyer 2012, henceforth DECH: *Diccionario etimológico y comparativo de las lenguas huaves*), which contains all available lexical materials, both published and unpublished, a more complete reconstruction of the pH root lexicon, and extensive attention to the origin of Huave loanword vocabulary. The present paper offers a summary of the results of this last topic.

Excluding borrowings from Spanish, DECH contains 1595 reconstructed pH roots. Of these, 256 (16%) are analyzed as “certainly” or “likely” to be borrowings from other Mesoamerican languages. An additional 138 roots are identified more cautiously as “possible” loanwords, giving a total of 394, or 24.7% of the Huave root lexicon. Put differently, this investigation suggests that between one sixth and one quarter of the (indigenous) Huave lexicon has resulted from interlanguage contact.

Table 1 below breaks down the data by originating language family. In cases where two or more language families could have been the donor they were given a fractional amount; fractional totals were rounded down to the nearest integer.

<table>
<thead>
<tr>
<th>family</th>
<th>likely</th>
<th>possible</th>
<th>total</th>
<th>percentage of likely</th>
<th>percentage of total</th>
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<tbody>
<tr>
<td>Mayan</td>
<td>106</td>
<td>72</td>
<td>178</td>
<td>.41</td>
<td>.45</td>
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<tr>
<td>Mixe-Zoquean</td>
<td>85</td>
<td>39</td>
<td>124</td>
<td>.33</td>
<td>.31</td>
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<td>Zapotecan</td>
<td>21</td>
<td>13</td>
<td>34</td>
<td>.08</td>
<td>.09</td>
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<td>6</td>
<td>11</td>
<td>.02</td>
<td>.03</td>
</tr>
<tr>
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<td>8</td>
<td>15</td>
<td>.03</td>
<td>.04</td>
</tr>
<tr>
<td>Nahuatl</td>
<td>4</td>
<td>0</td>
<td>5</td>
<td>.03</td>
<td>.01</td>
</tr>
<tr>
<td>Mixe-Zoquean (areal diffusion)</td>
<td>13</td>
<td>0</td>
<td>13</td>
<td>.05</td>
<td>.03</td>
</tr>
<tr>
<td>Diffusion (other or unknown source)</td>
<td>10</td>
<td>0</td>
<td>10</td>
<td>.04</td>
<td>.03</td>
</tr>
<tr>
<td>Nahuatl (post-colonial diffusion)</td>
<td>5</td>
<td>0</td>
<td>5</td>
<td>.02</td>
<td>.01</td>
</tr>
<tr>
<td>Total</td>
<td>256</td>
<td>138</td>
<td>394</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 1: Loanwords in Huave by Language of Origin

As can be seen, Mayan languages have provided the most loanwords, over 40%, followed by Mixe-Zoquean languages, which produced about one third of borrowings. Although currently Isthmus Zapotec is the only indigenous language spoken in an area contiguous with the Huave zone, the Zapotec loanwords comprise less than 10%. Finally, along with minor contributions from Totonacan, Oaxaca Chontal and Nahuatl, about 7-11% of borrowings are evidently areally diffused words (German *Wanderwörter*) for which it is impossible to determine the most proximal source of the loan, and even in some cases the originating language family.
After an introduction to Huave phonology (§2) the remainder of the paper provides a sampling of the data in DECH, focusing on the Mayan (§4), Mixe-Zoquean (§4) and Zapotecan (§5) loans, as well as cases of areal diffusion (§7). The conclusion provides some speculation on the significance of the data for the study of pre-contact Mesoamerica and the origin of the Huave people.

**Notes on transcription**

All Huave data are in **boldface** and, unless otherwise indicated, appear in standard Huave orthography (see Appendix A). Bolded forms preceded by * are proto-Huave; Huave forms enclosed by double brackets [[…]] are taken from Suárez (1975) (henceforth JS) and those enclosed by [… ] are taken from Paul Radin’s unpublished field notes.

Angled brackets (…) enclose data taken verbatim from historical source documents. Non-Huave forms, when written in a standard orthography, are enclosed between doubled angled brackets ⟨ ⟨…⟩ ⟩.

Data from other languages appears in italics, and when not enclosed in brackets are phonological representations: for Mayan I follow the transcriptional system of Kaufman & Justeson (2003) and for Mixe-Zoque languages the representation is usually that of Wichmann (1995). Forms taken from Dienhart’s (1997) comparative Mayan dictionary are enclosed in ⟨ ⟨…⟩ ⟩ to indicate that they are phonologically interpreted data from historical sources. A hyphen preceding or following a single morpheme is included either when (a) the form was written this way in the data source, or (b) if the morpheme is a bound root or affix.

Read > as ‘borrowed as’; < ‘borrowed from’. Abbreviations for sources are given after the author’s name in the References section. Abbreviations enclosed in square brackets indicate if a borrowing has been mentioned by a previous author, e.g. [JS] means that Suárez (1975) noted the same or a similar connection.

2. Huave Phonology

Before proceeding it will be useful to review the phonology of PH and briefly survey the development of the contemporary dialects.

2.1 Proto-Huave Phonology

2.1.1 Inventory

The segment inventory of PH is shown in the table below, with phonetic interpretation of ambiguous symbols given at right:
vowels i e a o i
voiceless stops/affricates p t c k kʰ c = [ts]
prenasalized stops mb nd nc ng ngʰ ne = [nts], ng(*) = [ŋg(*)]
fricative s
sonorant consonants m n l r ŋ r = [ɾ], ř = [ɾ]
glides y w h

Table 2: Proto-Huave Segment Inventory

2.1.2. Prosodic properties

pH syllables were always open, i.e. of the form *CV or *V only. In addition, the syllable nucleus (V) could be lengthened by a second, ordinarily voiceless, mora: *CVh. Stress fell on the penultimate syllable. There was also a contrast in two types of pitch-accent, high and falling, but this is maintained (marginally) only in Mo.

2.1.3. Phonotactic restrictions

Root morphemes ordinarily have 2 syllables, i.e. are CV₁CV₂, but occasionally have just one, CV₁; most trisyllabic roots are borrowings or result from reduplication or suffixing. pH appears to have system of vowel harmony which, in roots, normally places significant cooccurrence restrictions on V₁ and V₂, permitting only the following types:

(1)a. V₁ = V₂: *CiCi, *CeCe, *CaCa, *CoCo, *CiCi
b. V₁ and V₂ differ in backness. Only the back vowel has a height contrast.
   i. V₁ is back: *CaCɪ, *CoCɪ, *CiCɪ (*t is of underdetermined height)
   ii. V₂ is back and V₁ agrees in height with V₂: *CiCɪ, *CeCo, *CeCa.

Study of the full range of roots collected in DECH has revealed an additional phonotactic restriction:

(2) Prenasalized Stop Restriction (PSR): No pH root contains two distinct prenasalized stops. In other words, although *mbVmVbV or *ndVndVV roots do occur, no roots have the form *ngVmbV, *mbVnc or *ncVmb, for example.

The PSR has important consequences for the analysis of borrowing data (§3.2.1).

2.2. Development of contemporary Huave

Four historical processes completely altered the phonological system of the proto-language:

(3)a. Apocope: postonic vowels were deleted, including all word-final vowels
b. **Diphthongization**: Complex diphthongs developed through assimilation of properties of following vowels.

c. **Palatalization**: Plain and secondarily palatalized consonants, in PH conditioned allophonically by the following vowel, became contrastive, giving in all dialects two series of consonants: palatalized (C') and plain (C).

d. **Vocalic chain shifts**: Current dialects show the results of a chain shift in vowel place, with F generally the most conservative and MO the most innovative; pH *i* was nowhere preserved intact, becoming F MA u /u/, D yu /ü/, MO e /e/: i. *katt* ‘fish’ > F katy /kat'/ [kat'], MA D küt /kit'/ [kit'], MO küt /kit'/ [kют']

ii. *mbese* ‘nail’ > F MA D mbe to /mb'es'/ [mbeš], MO mbeax /mb'as'/ [mb̥aš]

iii. *ndik* ‘sea’ > F ndyuik /nd'uk'/ [nd'ui̯k'], D ndyuk /nd'ük'/ [nd'ui̯k'],
     MA ndyuk /nd'uk'/ [nd'u̯k], MO ndek /nd'ek'/ [nde̯k]

In almost all contexts *CICi* and *CICt* have merged; where the distinction cannot be reconstructed I write *CICt*.

3. **Borrowings from Mayan**

Mayan languages have provided the source for the largest number of loan words in Huave. Many of these come from Ch’olan languages (a few from Tzeltalan), with surprising correspondences with Ch’ol, Ch’orti’ and the colonial records of Ch’olt’i’. In addition a substantial number of loans have Yucatecan origin, while a few have attested cognates known only from eastern Mayan or Huastecan.

Mayan borrowings can be classified and partially dated according to various criteria. In some cases only a particular language or subfamily has a source form whose specific properties closely approximate those of PH; borrowing then probably post-dates the innovation of such these properties. Beyond this, however, the way the Mayan ejectives were adapted in PH defines two distinct groups of loans:

(4)a. **Group 1**: Mayan ejectives > PH (voiceless) plosive stops and affricates

b. **Group 2**: Mayan ejectives > PH prenasalized stops and affricates

These two groups partly correlate with other criteria. Group 1 borrowings are frequently older, or at least, the source form is reconstructible to PMA or to one of its major subgroupings. Group 2 borrowings are often from Ch’olan-Tzeltalan sources, not infrequently from a particular Ch’olan language, with source forms often not reconstructible further back than proto-Ch’olan, or else other criteria show that they must have been borrowed late. Yet others have demonstrably Yucatecan sources; but borrowings which have no plausible Yucatecan or Ch’olan-Tzeltalan source are absent from Group 2. Semantically Group 1 borrowings sometimes have a looser semantic connection to their source form
meanings, whereas Group 2 borrowings often show surprising semantic coincidence.

This difference in adaptation of the Mayan ejectives in Huave requires an historical explanation and two possibilities are immediately available.

On the one hand, Group 1 might consist of historically earlier borrowings whereas Group 2 borrowings might consist of later ones. This explanation relies on several assumptions. First, that changes in the phonology of proto-Mayan or proto-Huave, or both, led to the Mayan ejectives being perceived differently by Huave speakers in different periods of time. Second, that Huave contact with Mayan was sufficiently longstanding that two such periods of adaptation could have taken place. Third, to the extent that Group 2 borrowings are chiefly from Ch’olan sources, we may hypothesize that they represent contacts between Huave speakers and late classical or post-classical Mayan civilization.

On the other hand, the difference in treatment of ejectives could also reflect the route by which loan words arrived in Huave. In particular, Group 1 borrowings might be indirect, having passed from Mayan sources into Huave through an intermediary language which first adapted the ejectives as voiceless stops. (Unfortunately there are many potential intermediary languages for which we have either scant information or none at all.) Group 2 borrowings would then have to result from direct contacts between Mayans and Huaves.

Since the data at present appears insufficient to decide among these alternatives, Group 1 will be called early/indirect and Group 2, late/direct.

3.1. Early/indirect borrowings

3.1.1. Mayan ejectives > Huave plosives

(5) *t’ > *t
   *hoto ‘whetstone’
   • YUC TZO TZEL jot’ ‘to scratch’; CHOL jot’ ‘scrape, hollow out’

(6) *t’, *č’ > *t
   a. *pōti ‘tick (animal)’
      • pMA *pot’ ‘bedbug’ (> e.g. MCH poch’ ‘biting animal such as a tick’)
      ➤ Very early if directly from pMA since must predate *t’ > *č’; CHO ’bodi ‘tick’ and ZOCOP poti ‘ringworm, mange’ suggest diffusion
   b. *tohpo, *tehpo ‘blind in one eye’ > Mo netoob, MA ūntyojp, F [-tu:p]; D atyop ‘blind’; D ⟨atēop⟩ ‘lose an eye’
      • PYU *č’oHp ‘blind; missing an ear or leg’ > ITZÁ č’oop; cf. JAK ⟨[ts’op]⟩ ‘blind’ [JS]
      ➤ Direct borrowing would not explain *č’ > *t
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(7) *tʃ’*, *c’, *e’ > *c

a. *cini* ‘poorly developed (animals)’ > Mo chin
   - PM a *tʃ’i:n ‘small’ > Tz e TOJ Jak Mam ch’in
b. *caha* ‘to rinse’ (truncated < pre-PH *caha-caha*)
   - PM a *c’ah* > Jak ch’ai ‘to wash’; CHLT (caha) tz’aha ‘immerse in water’;
     Chol tz’ai ‘to soak’, Tzo tz’ai-el
c. *cohč/ciheč* ‘to suck, kiss’
   - PYUC PCChol *c’uhc’ ‘to suck, kiss’ [FB]; cf. also PMX *cuʔkš ‘to kiss’,
     PMZ *cuʔc ‘to suckle, to chew’
d. *cehe* ‘mojarra’
   - CHLT (xceh) x-ch’ej, Mop ch’eh (BS)
e. *c̃oḥc̃ɪ ‘to suck, kiss’ [FB]; cf. also PMX *cuʔkš ‘to kiss’,
   *c̃uʔc ‘to suckle, to chew’

(8) *k’, *k’ > *c

a. *wihci* ‘disperse, spread’ (perh. dim. of lost root *wehe*) > Mo awiich ‘spread, throw’;
   - MO wijdjiu ‘spill, sprinkled’; D awiich ‘to dump; pour (liquid)’; D (a’viheč) ‘soft or thin objects’;
   - MA awiich ‘to throw, toss’; F wijchiol ‘stinking toe (large resin-producing tree)’ < *wijc̃h-xioł ‘disperse-tree’
   - PM abaj *wek’ ‘to water, splash, spill’ > Itzá wek ‘splash vi. (liquids, grain);’
     CHLT (weče) weč’e ‘to sow’
   - *c’ implies a Ch’olan source, but absence of prenasalization suggests an
     early/indirect borrowing; *ih does not match Mayan *e, although cf. CHLT (viít) witi ‘to sow’,
     CHOL wit ‘adverb related to manners of falling’
b. *iheč* ‘chigoe flea’ > D [yuc’], yuch
   - PM a *wō:k-VC k’aq ‘chigoe flea’ lit. ‘flea that enters’ > Huas otx-ax tx’ak,
     Jak (jučé), CHRT och-em ch’ak (TK), Toj och-un k’ak
   - PM a *wuk’ ‘louse’ > Huas utx’, CHRT Chol Tzo Tzel uch’ (TK), Chol uch’-ja’
     ‘mosquito’, previously also ñ’colmoyote (a fly that puts its eggs under the skin)
   - Mayan etyma poss. related (or confused); ZoR uhsuk ‘fly’ and MoLU ñi:c ~ ñi:s
     ‘buzz (bees)’ suggest diffusion to or from MZ.

(9) *k’, *q’ > *k

a. *kaya* ‘angry; venom’ > MA ajkuy ‘get angry’ F ajkay; MO ajkuy ‘get angry, become jealous or indignant’;
   - D (a’hkuy) ‘get angry; scold; answer insolently’; MA (akki) ‘get angry, argue; quarrel’
   - Yuc k’ayah ‘to quarrel with words’; CHLT (caye) k’aye ‘to quarrel’
b. *siḥki* ‘cigarette’
   - PMCTR *si:k’ ‘cigarette, tobacco’ [JS]
c. *loḥki* ‘uproot, extract’
   - PM a *loq’ ‘go out’ > PCChol lo’k ‘go or come out’ > Chol lok’ ‘remove’
• PMA *lok’ ‘to scratch’ > MAM TEKTITEKO t-lok’ ‘root’, MAM lok’ ‘to scratch, wash’,
HUAS lote’-iy ‘scratch, scrape’ vt., POQOMAM ihrolok’ej ‘made furrows, grooves’
d. *kele ‘to guard’ > MA (-kel); D ⟨akyel⟩ ‘take care of, protect’
• PZO *ken ‘see’ vt. (> ZOCOP ken-u ‘looked at’) > PMAOCC *k’el ‘look at’ > CHOL
TZO Toj k’el (TK)
☞ Probably borrowed by PMAOCC from PZO (TK). Problematic: although *I suggests
a direct borrowing, PMAOCC *k’ does not correspond to *ng.
e. *k’i ‘bird’
• PMA *q’uʔq’ ‘quetzal, feather’ > ITZÁ TZEL CHOL k’uk’um ‘feather’; LAC hun-
k’uk’ ‘bird of prey, eagle’
f. *hiki ‘close the mouth’ > D ⟨ahhikhhik⟩
*haka ‘open the mouth’ > MO ajakak; D MA ajakjak umbey ‘pant’, MO ajakjak
ombeay; D ⟨ahakumbey⟩ ‘open the mouth wide as if gasping for air’
• PMA *jiq’ > CHOL jik’i ‘breathe’; CHOL TZO TEL jik’ ‘choke’ (TK)
• PMA *jaq’ ‘open the mouth’ > CHRT jak’i ~ ajk’i ‘swallow quickly or recklessly, gulp
down carelessly’; CHRT jak’i ik’ar ‘breathe’; CHOL jak’ ‘inhale’; MAM jaq’ ‘choke’
(10) *k’u- ≈ *kʷ
*kʷala ‘son, daughter’
• PMAO *k’uʔa:l > TEKTITEKO kwaʔl ‘child’, MAM k’waʔl ‘man’s son’;
CHRT k’wa’r ‘nephew, niece’ (TK)
☞ A surprising resemblance with eastern Mayan, noted as early as Brasseur de
Bourbourg (1861). The Mayan etymon is restricted to the eastern branch, but
CHRT k’wa’r suggests further areal diffusion
3.1.2. Early/indirect on other grounds (selection)
(11)a. *mangala ‘half-ripe (corn cob)’ > MO amangal axil ‘half-ripe corn cob’
• PMA *ŋal ‘corn cob’ > CHU JAK MCH yal
• CHIC ⟨wal isis⟩ ‘maize kernels’
☞ Only CHUJ JAK MCH retain *ŋ so if *mangala \( \prec \) PMA *ŋal, it is either very early
or indirect
b. *ti ‘eat’ > F a-ty, MA MO ū-ty, MO ūe-t; D ⟨üet⟩ ‘eat or bite flesh’
• PMA *tiʔ ‘eat meat, bite’ > TZO TEL ti’; TOJ ti’ ‘eat’
☞ An irregular archaic verb in Huave
MOP ⟨bac⟩
• YUC baach, ITZÁ b’ach (HF), MOP ⟨bac⟩
Probably indirect: Yucatecan *b’ should have given PH *mb
d. *mbit ‘sew’
• MOP ITZÁ puutz’ ‘needle’ (HF), YUC ⟨padz⟩ [JS]
• CHRT ⟨buch’⟩ ‘point, pointed object, needle, sliver’, CHRT b’uchur ‘sticking up,
protruding, bulging’
☞ Not close enough phonologically to be direct source
e. *riwi ‘catfish’ > MA rruw, MO rew, D rriw, F rruy
• YUC ⟨ru⟩, MOP ⟨rlw⟩, ITZÁ aj-лу’ (HF), CHLT ⟨lu, ahl⟩; CHOL ajlu’, xlu’ ‘type
of catfish’; LAC ⟨lu⟩ ‘type of fish lacking scales’
☞ Since PH has *I, the etymon must have passed through some other language in
which *I > r (cf. LAC ⟨ru⟩ ‘little bobo (fish)’)

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3.2. Late/direct borrowings

3.2.1. Mayan ejective > Huave prenasalized stop

(12) *t’ > *nd
a. *ndohki ‘to cut, burst’ > F ndojky- ‘snap in two (rope, cord)’; D andujk ‘cut, cut the neck of’; MA ndejkjen ‘burst (e.g. bottom of a sack)’ dim.
   • YUC t’ook ‘burst, break (noose, cord)’ poss. < PMZ *tuk ‘to pick fruit’; PZP *(n)toʔo(ki) ‘to cut’ [SZ] may suggest an early diffusion
b. *ndoho ‘stabbing, sharp’ > MO ndójan tiüt ‘loud sound’; MO ndojndoj ‘stabbing, sharp’
   • YUC t’óoh ‘to bite, sting’
c. *ndɨhɨ-ndɨhɨ ‘tap one’s fingers’ > MA andujnduj ‘palpitate (heart)’;
   • CHRT (t’oh) ‘tap one’s fingers’
d. *ndahpa ‘burn’ vi.
   • YUC t’áab(-al) ‘light on fire’; ITZA t’aab’i ‘start burning’, MOP t’aʔabi
   ☞ Yucatecan *t’ab’ > PH *ndahmba but the PSR (constraint on adjacent prenasalized stops in PH, §2.1.2) dissimilates *mb to *p.

(13) *č’ > *nc
a. *ncelele/*ncilili ‘the evil eye; newborn’s colic’ > MO nchaleael, MA nchilil, D ndxilily
   • CHOL ch’e’lel ‘crying’ (< ch’e’ ‘noise’); cf. LAC {{ch’e’j}} ‘noise’; YUC ch’e’ej ‘loud noise that hurts the ears’
   ☞ Morphology and meaning of ch’e’lel are specific to Chol
b. *lonco, *lenco ‘yagual (padded ring); faja (girdle, band, strip)’ > F lonts ‘yagual; hanging net to keep food in’; MA [[lonc, lonce]] ‘faja’, D [[lonce]], F [[lunci]]; D lonts ‘net made of palm leaves or vines used to hold large round tortillas (totopos)’
   • TZ O loch’-ol ‘encircling (object), perched’ (BS), CHLT {locho} loch’o ‘encompass, embrace’
c. *ncayha- ‘moist’ > MO ntsajyan
   • pMA *c’ah ‘to soak’ > TZE L tz’aj; CHOL tz’aj ‘to dip’; CHRT {tz’ah} ‘moisture, humidity’; CHRT {tz’ayi} tz’ahyi ‘to wet, humidify, irrigate’
   • PYUC *ča(:)ʔ ‘gum’ > ITZA MOP chaʔ; PMAOR *č’aʔ > TUZANTEC ch’aʔ ‘chew something rubbery’ [JS]
   ☞ Source form unclear: *nc suggests a direct borrowing from a Mayan ejective, which however appears not in pYUC *č but only in geographically distant pMAOR *č’.
d. *ncàha ‘gum’
   • PYUC *ča(:)ʔ ‘gum’ > ITZA MOP chaʔ; PMAOR *č’aʔ > TUZANTEC ch’aʔ ‘chew something rubbery’ [JS]
   • Source form unclear: *nc suggests a direct borrowing from a Mayan ejective, which however appears not in pYUC *č but only in geographically distant pMAOR *č’.
e. *moci-moci/mici-mici (~ *mece-mece) ‘to blink’
   > MO amochmoch, MO D MA amechmeh
   *mono(-monico)/*mici(-minci) ‘to close, join together’
   > MO t’amontsmont ‘to blink’, MO amenchmench ‘to close (eyes), to blink; F amontsos ‘to close (hand, eye)’, MA amontsos ‘to join (hands), MA [[-muncruicu]] ‘to close, join’, D {amondz} ‘to close (pages of a book, eyes, knife blade’, D {amonzoots} ‘to close’ vt.
• PMA *muc’ ‘close the eyes’ > TZO Tzel Toj Chol Chuj Qan mutz’; CHRT (*mo’iz’-i) ‘to close, sink (e.g. body part)’, CHRT (*mo’iz’i e chihr) ‘close a net bag’
☞ An interesting doublet: the prenasalization expected from *e’ appears in *mincici but not in *micici.
f. *tinc’ ‘spill out’ > D ajtindx ‘to spill (from full container)’, Mo ajtinich tiüt; D ajtindx tixiňik ‘I have reflux’ (tixiňik ‘in my neck’) (RN)
• YUC títs’ ‘jump (drops of spilled liquid)’
g. *nciht ‘edible part of a fish attached to the intestine, popularly called the “navel” of the fish’
• CHOL ch’uyit ‘anus’

(14) *k’ > *ng
a. *ngaya ‘to pay’
• PMA *k’a:y- ‘buy’ > YUC (kaay), cf. KCH ([ k’ay ])
b. *-h-ngoto ‘arrive’
• PMA *q’ot ‘arrive, get there’ > PCHOL *k’ot > CHOL TZO k’ot-el, CHLT (cotel), CHRT k’ot

c. *hongoko ‘scoop up with both hands’ (dissimilated < *hongo-ngo, redup. of *hongo) > MA ajongok ‘pick up everything that can be grasped or gathered in two hands’; D (jahongok) ‘grab object like maize, earth, etc.’
• PMAOCC *jok’ ‘pull out, dig’ > CHOL jok’ ‘dig out, scoop out with one’s hand’; CHRT jok’ ‘pull out’
d. *tanga ‘grow’
• PMA *taq’ ‘ripe’ > YUC tak’an ‘grown, ripe’; LAC Mop tâk’an ‘ripe’, PCHOL *tâk’-an ‘ripe, cooked’ > CHRT tak’an, CHLT (tacan), Tzel tak’an

e. *ngoloso ‘with a brittle noise’ (e.g. palm leaves, tomatillo, something toasted, inside of a container) > Mo angolosüy ‘make a noise, to crunch’, MA ñungolosüy ‘noise like animal rummaging through garbage’
• CHOL k’olina ‘making a sound (something inside a container)’, TZO k’olet; CHLT (colai) ‘hand mill’; cf. YUC k’ol ‘strike, hurt, flay’ (BS)
f. *ngåkha ‘bitter, bile’ (poss. from redup. in pre-PH *ngah-kah)
• PMA *k’ah ‘bitter; bile’ > LAC Itzá Mop Jak k’aj ‘bitter’, YUC k’áaj; YUC k’áa’k’áaj ‘extremely bitter’; PCHOL *c’ah ‘bitter’ [JS]
☞ Source presumably Yucatecan since PCHOL has *c’

3.2.2. Late/direct borrowings on other grounds
Phonological or semantic criteria establish that the following loanwords must be late or have a specific Mayan source language.

(15)a. *til ‘turkey’
• TZO Tzel tuluk’ < PZO *tuʔmuk [JS, in part]
☞ The *t shows that *til is specifically from Tzeltalan, but an indirect borrowing via CHO dulu is also possible.
b. *siru ‘long, sharp and pointed (head of an animal)’ > F xur xing ‘needlefish’; Mo pemb xor ‘white pelican’; Mo xor jüm ‘swamp crocodile’
• CHRT ⟨ah xur mut⟩ ‘type of bird with a sharp-edged bill’; CHRT ⟨xur-i⟩ ‘cut open or cut up, cut with a knife’
• PMAOCC *šul ‘to stab,poke’ > CHT xul ‘stick through a crack’
☞ Mayan *l > *r and the specific connection to birds point to a loan specifically from CHRT.
c. *loko ‘bobo (fish)’ > MO MA lok
• CHLT ⟨loc⟩ ‘porgy (fish)’
d. *masi ‘canoe’ > F max, MA D Mo müx; MA müx sow ‘pig trough’ (made from a hollowed out trunk)
• CHRT ⟨max⟩ ‘hole, cavity, hollow; weevil’; CHRT ⟨maxir⟩ ‘bored, hollowed out, weevily’; CHRT ⟨maxmax uyoy te⟩ ‘hollowed out tree trunk’
e. *loku ‘bobo (fish)’ > F [nunguc]
• CHOL x-kuchijel ‘carrier, porter’; CHOL kuchijel ‘to load, carry’ (initial *ng unexplained)
f. *loko/löci ‘sharp point’ > Mo alech ‘be a bullfighter, provoke into following; to fish with a hook’; F [niluc] ‘fish hook’
• CHOL lujch-in ‘to gore (bull)’
g. *tofo-co ‘disabled (in limb)’
• CHOL lor-of ‘missing an arm’; CHOL tur ‘missing a limb’
h. *cepele ~ cipye ‘skin wound; to peel’ > F achepeley ‘peel’ vt.; F chepeley- ‘be lacerated (skin)’; MA ⟨achupei⟩ ‘to peel’, MO achepeay
• CHOL ŏ{tsep, zep} ‘cut, injure’; CHOL ŏ{tzepeyl ‘cut’ adj.; CHOL ŏ{tzejpeyl ‘cut oneself’
☞ The alternation *cepele ~ cipye is curious given that PH has no suffix *-ele (although *-ye could be an old reflexive); this establishes a borrowing from the Chol derivatives in -el
i. *wele-(we)le/*wili-(wi)li ‘throw, toss, turn over’ > MO awealeal ‘to throw, toss’;
D awilyily ‘throw, toss (small object)’; MA awili ‘turn over, turn around’ vt.
• PCHOL *wuhl ‘turn around’ > CHOL wejlel ‘to fly’; CHOL welwelña ‘flying’;
TZEL wihl ‘to fly’, TZO vil, vel, vigel (BS)
j. *pohko/pihki ‘throw away; insert somewhere’ > D apojk ‘insert somewhere’;
D apuyjk ‘id. (dim.)’; MO apeeg ‘sow small seeds’; MA apujk ‘sow, throw or put seeds on the ground’
• CHRT ⟨buka⟩ ‘sow (seed), scatter broadcast’; TZO pukel ‘distribute, scatter’;
CHOL puk ‘distribute’, CHRT puki
k. *tahta ‘shake out (to clean)’ (poss. from lost dim. **tihti) > D ata jan ‘to shake’,
F atajajat, MO ata tat ‘to clean; to shake, thresh’
• CHOL tojton ‘to shake’; CHOL tijtin ‘shake out, dust’; CHLT ⟨tijtin⟩ ‘shake out (to clean)’;
CHRT tijti ‘to shake’; YUC tiit ‘to beat’
l. *kali ‘to wait’
• CHOL ŏ{kähl ‘to wait’
m. *lamba ‘to calm’ > F alamb ‘grow calm (wind)’; F Mo lamban ‘calm’;
MA lambaw ‘calm (wind)’
• CHOL läjm ~ làm ‘calm down (illness)’
n. *sehnd ‘lean against’
• CHOL ŏ{sejnil ‘wedge, supports, supporting cushions’
from sporadic word-final fortition

o. *imi ‘to moan’; *ema ‘complain’ > D [[ayam ulch]] ‘gnash one’s teeth’; F aion ‘to bellow, moo’; MA ayüm ‘moo, complain (animals)’; MO aiüm ‘to moan, moo, roar’; D [[aion]] ‘to sigh, groan; rustling (wind); pe aling (bells); swell (ocean); bellowing (bull)
  • CHLT (yam) ‘quarrel, brawl’
p. *misi ‘little’ > F namix ‘small, very little’, MO namix ‘medium, average; change (coins)’, MA MO namix kich ‘boy’, D [| namiš |] ‘very small’
  • CHRT [��] yam ۧ ‘quarrel, brawl’

c. *cepe ‘to flame’ > D, MA ačepchep ‘make sparks’; MO chajpean ‘hot; burning (in courage)’; D [�� ačepč ep ۧ] ‘to burn (from a sting)’; D [�� čeheˈpäov ۧ] ‘to burn, flame’
  • CHOL [�� čäp] ‘to cook, boil’ > C HRT [�� chap-i ۧ]; C HLT [�� chapa] ‘cook on the fire’; CHOL chäp ‘to boil’

3.3. Mayan *b’, *p’, *p and Huave vacillation between *mb, *p

The Mayan labial obstruents, like the ejectives, show interesting developments in Huave loanwords. Generally speaking PMA *b’ appears as *mb:

(16) *b’ > *mb
  a. *h-mbóko ‘to smell (produce an odor)’
     • YUC bok ‘odor’, YUC {[tu-bok]} ‘stinking’, MOP {[bok]} ‘aromatic; odor’, cf. Q’ECHI {[bok]} ‘odor, aroma’
  b. *kamba ‘(of the) opposite side, other side’ (diss. by PSR < *ngamba)
     • kembe, *kemba ‘left (hand)’ > MA ŋikyemb, D kemb, MO kiamb, F [[kiamb]]
     • PMA *q’ab ‘hand, arm’ (via, e.g. CHRT iz ’ej-k’ab’ ‘left hand’)
  c. *cemba > ‘quiet, still’ > MA [[aciemb]]; D [[ahčamb]] ‘become less intense’
     • PCHOL *č’ab ‘silent, not talking’ (TK) > TOJ ch’ab’-an; TZO ch’ab’- ‘be quiet, stop talking’ (TK); CHOL ch’äb’ ‘to quiet’
  d. *mbéte ‘price; expensive’ > MO onbeat ‘price’, F umbetry; Mo nembeat ‘expensive’, MA D ŋumbety, D {[ambet]} ‘scarcity’, MA (shou ambete) ‘to lack’
     • PMABAJ *b’et ‘debt’ > CHOL TZO TZEL CHRT b’et (TK)
     • cf. ZPZGO be⁴tti⁴ ‘buy (completive)’, ZPAT b’is (but: CHRT TOJ b’is) (TK) [JS]
  e. *mbaka ‘fin’ > MA mbak, D {[mbak]}, MO mi-mbak küt ‘operculum’
     • PMA *b’aaq ‘bone’ > ITZÁ CHRT Toj b’ak; YUC b’aak ‘bone; skinny’, LAC TZO TZEL b’ak (TK)
  f. *mbalono ‘striped or spotted (animal)’ > MA mbalon, MO balon
     • PMA *b’ahlam ‘jaguar’ > TZO b’olom, CHRT (bahlan) (TK)

On the other hand, Western Mayan *p’ typically appears as *p:

(17) *p’ > *p
  a. *pese ‘weigh’
     • PMA *b’is ‘weigh, count’ > YUC Itzá p’iis ‘weigh’, MOP CHOL TZO TZEL p’is (but: CHRT TOJ CHUI b’is) (TK) [JS]
  b. *htipi ‘grow’ > F {[ahtip-miond]} ‘sigh deeply, inhale’, MA atyup miyünd ‘to gasp (dying); be asphyxiated’
• YUC tip’ ‘get big, be excessive in portion, size or weight’, CHLT (tipil) tip’il ‘swollen’, CHLT (tipacel) tip’k’ael ‘swell up’ (BS)
   • PMABAJ *p’ol ‘to increase’ > T ZO p’ol (TK), T ZEL p’ohl, CHLT (pola) p’ola ‘multiply’ vi., CHRT (boron) ‘swelling, swollen place’, CHRT (bor) ‘growth, increase, swelling, wealth’
d. *pata ‘fierce’
e. *sipi ‘fat, swollen’ > D F MA MO naxip ‘fat’, F axip, axipxip ‘swell up, get fat’, MO axip ‘get fat; ferment (dough); swell up’
   • PMA *sip ‘swell up’ > Y UC M OP sip’ ‘swollen’, C HRT sib’ ‘have stomach discomfort, bloat, inflate’; I XIL sip- ‘get a stomach upset from overeating’, KCH sip- ‘swell up, rise (bread)’ (WL)

However, Mayan sources with labial stops produced at least three doublets in PH, one with *mb and another with *p (18a-b, d); in (18c) PH has only *mb < *p:

(18) *b’/*p’ > *mb/*p

a. *mbal ~ pahl ‘twist, turn, spin, untangle’
   MO ambül ‘twist’ vt., D ambůlý, MA (ambuel)
   D apůjly ‘twist (one’s foot)’, F apajly toyt ‘id.’, MO apůüel ‘untangle, unfold’, D (a puhel) ‘unwind a cord’, MA (-půehli, -půelhli) ‘unwind, untangle, unroll, unfold; to twist’
   • PMABAJ *b’al > T ZEL b’al ‘roll up, twist’; TOJ b’al ‘roll up’
   • T ZO p’al, MOP p’āl, ITZÁ p’āl ‘untwist’ (WL), CHLT (palbil) p’ālbil ‘untwist’ [JS, in part]

☞ Mayan etyma for ‘twist’ and ‘untwist’ have been confused in Huave
   *sibp ‘bathe’ vi. > D axyujp, MA axüjp, MO axeeb, F axijp
   • CHRT (subi) ‘dip up and down, rinse’
   • CHOL sup’-el ‘submerge, dunk’
c. *mbiti-ki ‘load or carry on the shoulders’ > MO MA ambitik
   • CHRT (biti) ‘carry on head or shoulders, support on upper end’, CHLT (piiti) p’iti ‘carry on the shoulders’, YUC p’it-kuch ‘carry lightly on shoulders’ (BS)
d. *mbilt ‘to burn’ > F ambuly ‘to burn’, D ambyuely; MA ambuly ‘set fire, burn’, Mo ambel
   • CHOL pul ‘to burn’; CHLT (pulu)’; T ZEL (s-pulerl) ‘flaming’, CHRT puruy ‘burn’ vi., CHLT (pulpu) ‘having an upset stomach; to burst open’
   • PMACTR *b’u(·)l’ ‘foam; to boil, to bubble’ > T ZEL b’ul-an ‘to boil’
   • CHOL bu’lich ‘sweat’ n.

☞ Huave forms show semantic differentiation:*pilt expresses the sensation of heat, whereas *mbilt refers to the physical process of burning.
The explanation for these borrowing doublets is probably to be found in the complex (and controversial) evolution of *p’ in Western Mayan. Wichmann (2006) has argued that *p’ did not develop by regular sound change in proto-Ch’olan. Instead, it was only in Yucatecan that *p’ emerged in well-defined phonological contexts (from *b’ and *p). Yucatecan source words with *p’ then diffused individually through the Mayan lowlands into Ch’olan (and elsewhere), so that ultimately p’ appears only sporadically in Ch’olan (with geographically remote Ch’orti’ untouched).

3.4. Mayan borrowings of uncertain chronology or provenance

In many cases, although a Mayan source is fairly evident, there is no secure evidence regarding its dating or route into Huave. Selected examples are shown below:

(19)a. *ci-(k) ‘it is said’ (evidential particle) > MO chük, chek, D chük, F chu
   • PMAOCC *ček-el ‘is seen, is noticeable’; CHRT chek-ta ‘appear, result’
   • PMABAJ (diffused) *čik-aʔn > MOP cha’kaan ‘is seen, is noticeable’; TZEL TZO chikan ‘visible, seen’

b. *taha-mbiyi ‘motmot (bird)’ > MO tajmbe
   • YUC toj ~ taj (isolated datum)

c. *siił ‘buzzard’
   • PMAOCC *šulem ‘buzzard’

d. *paya ‘hooded skunk’ > MO püy
   • PMA *pahar ‘skunk’ > YUC (paay) ‘skunk (malodorous)’, etc.
   • cf. also PZO *payaʔ ‘draw lines on’, zFL payaʔ ‘be streaked, to streak’

e. *sewe ‘jay bird’
   • PMACTR *še:w ‘blue bird; jay bird’ (also > CHO ⟨xewih⟩ (šɛˈwiʔ)
   ⇔ No Ch’olan or Yucatecan cognates but CHO borrowing suggests diffusion

f. *kowo ‘quern’: PMA *kaʔp ‘quern’ [JS]

g. *hele ‘clothes, skirt’ : PMAOCC *jal ‘to weave’

h. *kil’t ‘chest made of palm leaves’ > MA kuly ‘smaller woven basket; †chest made of palm leaves’, Mo kil ‘suitcase made of palm leaves’
   • MOP kuul ‘type of palm; heart of palm’ (BS), CHLT ⟨cuuhl, culh⟩ ‘type of palm’

i. *pakí ~ paha ‘shoe, sandal’ > F napaik, MA napaky, D napük, MO napük;
   • CHIC ⟨[pajau]⟩ ‘sandal’

j. *kisi-kisi ‘dysentery’
   • PMA *ki:s ‘fart’ > ITZÁ MOP kís
   • cf. also CHOL †kis ‘spoiled (meat), rancid (oil)’, ⟨kis-güelul⟩ kis-we’eläl ‘rotten meat, scraps of food’; CHOL k ‘is ‘adverb related to fish smells’

k. *wuál ‘forehead’ > MO owül, F xuvaly ‘crest’, D [−wil], D ⟨ju’wüol⟩
   • CHIC ⟨[iwal, euall]⟩ ‘forehead, eye’
   ⇔ CHO ⟨−abali⟩-a’bali ‘forehead’ suggests diffusion

l. *ihṭi ‘excrement’: PMA *pi:t ‘arse, anus’
Possibly quite old; cf. also TTNX *i:tin ‘animal excrement’; TTNX *jil:tin ‘faeces; fly eggs, mosquitoes’

m. *pa-wala ‘round’ (dissimilated < *wol) > MA MO pawal, D ⟨pawal⟩
  • pMA *wol > YUC wol ‘make a ball, make round’, pCHOL *wol ‘spherical’ > CHOL TZEL wol ⟨ol⟩ (BS)

n. *siki > F axuk ‘mend clothes’, F ⟨[-suksuk]⟩ ‘to dress’, MO axek ‘insert’
  *soko > F ⟨[-sok]⟩ ‘hook together’, D asok unbiem ‘weave palm leaves of a house’ (RN); MO MA asok ‘insert’, MO ⟨asook⟩ ‘put something into something similar’, MA ⟨asokso⟩ ‘intertwine’
  *sohki > MO asojiy ‘joint (of the body); knot (tree)’, MO ⟨asook⟩ ‘hook together’, D asojkey ‘get dressed’, MA asoijkey; D ⟨asuhk⟩ ‘set a broken bone’
  • pMAOR *so:k > MAM KCH xook ‘hook’, POQMCHI xooka
  • pCHOL *sohk ‘get tangled’ > CHOL sok ‘entangle (string, cord)’ (TK)

o. *mohko/mihki ‘to cover’ > F ⟨[-muh]⟩, MA ⟨-mohk⟩; D mojk ‘palapa (open-sided dwelling with thatched palm leaf roof)’, F moj(k) ‘kitchen made of palm leaves’, F ŋumujk ‘hat’, MO mojk ‘storage hut with thatched roof’;
  • pMA *muq ‘bury, hide’ vt. > YUC ⟨muc⟩ ‘to cover’, CHRT ⟨muk⟩ ‘bury, hide, store’, CHRT ⟨muhk⟩ ‘anything buried, etc.’, CHOL muk ‘bury, hide; to cover’, CHOL ⟨[ma:k-il, mä:k-il, mu:k-il]⟩ ‘lid’
  • *cipi ‘to fill’
  • YUC ⟨[ćup-saj]⟩ ‘fill’, LAC ⟨[k-u-ćup-ik]⟩; CHOL ⟨[ćep]⟩ ‘full’
  q. *siher, *sihei ‘root’ (> ‘lightning’)
  • LAC ⟨[(ʔa)-si:ć-(e:r)]⟩ ‘vein, root’; LAC ⟨[şiːć]⟩ ‘tendon’, YUC xiich’; MOP ⟨[şiːć]⟩ ‘vein, artery, tendon’; TZO ⟨[be-ć’ic]⟩ ‘vein’; CHRT ⟨noh chich⟩ ‘vein, prominent artery’

4. Borrowings from Mixe-Zoque

Borrowings from Mixe-Zoque can be divided into three groups:

(20) a. Possibly very old: the source form can be reconstructed in PMZ.
  b. Mixe origin: the source form occurs only in PMX or in a Mixean language
  i. Source in PMX, in Tapachultec, or in Veracruz Mixe
  ii. Source limited to Oaxaca Mixe
  c. Zoque origin: source form occurs only in pZO or in a Zoquean language.

For reasons of space the examples below contain only loans which are not mentioned in previous literature, or for which especially confirming new data has come to light.

4.1. Potentially early borrowings from MZ

(21)a. *pőwi ‘oven’: pZO *pow ‘cook in steam’
  ≡ cf. TTNX puː-waː ‘tin ‘pot for cooking tamales’ (puː- ‘container’)
  b. *cahka-ca ‘sky; heaven’ > F nangaj tsajkats, MA umbas akats, D ⟨[sakats]⟩; MO *nmas akats ‘heaven of glory’
  • PMZ *ma:ca?((a)k) ‘star’ > MOLU ma:ca?k
c. *mehece ‘heavy, heaviness’ > MO nemeech omeaats ‘heavy-hearted’
   - PMZ *hemec ‘heavy’ (but perh. > CHOL mech’ ‘bad (heart’)’

d. *newe ‘weave (a fence)’ > MO [[-now sok ʻemb]]; MA añow sok yüm ‘make one’s house (i.e. out of palm leaves)’, MO (Uñocang) (BB) prob. /on'ow käng/ ‘Mountain of Rocks’ (name of an island)
   - PMZ *neʔw ‘make a fence with stones’ > MTOT nɛ′′v ‘wall’, ZOTEX neʔŋ ‘to position (e.g. stones to make a wall)’

e. *capahcɪ ‘bobcat, lion’ > F tsapajch ‘bobcat’, MO tsapüüch; D tsapüjch ‘lion’, MA †(xahpuehxi)
   - PMZ *capac ‘red’: MSAY cabac-ka:hau ‘cougar, puma’ (< ‘red jaguar’), MOLU capas-ka:haʔu (CO)

e. *cot ‘come out (object)’ > MTOT coht ~ cot ‘take something off its handle, e.g. shovel, pickax’, ZOTEX cot-put ‘to fall (shit); emerge crossing over’

f. *kòhcɪ ‘to cut’: PMZ *ko:ʔc ‘to tan (hide); to break’ > ZOCOP koʔc ‘sink, hang vi., break vti.; destroy’

h. *kawáka ‘sapodilla, mamey sapote’: PMX *kaʔwak ‘marmalade fruit’

i. *hɨnɪm ‘rapid’ > MA najuñ, D nafen; MO najen ‘then, in a hurry, immediately, urgent’, F ajuñ ‘to hurry’
   - MSAY hunhúʔn, ZOCOP hiʔniʔniʔk

j. *pópo, *poposɪ ‘foam’
   - PMX *ʔu:ʔp-ʔi(k) ‘mole’ (kind of sauce) > MOLU ʔu:piʔk
   - PZO *ʔu:ʔah ‘beat mole’
   - PMX *ʔo:ʔp ‘to foam’ > MOLU ʔo:p ‘produce foam’, MOLU ʔo:p-i-paʔ ‘something which produces foam, bejuco asquiote’
   - ZOCOP ʔo:piʔk ‘to foam’

k. *piwi ‘remove seeds, card’ > MO apiw
   - PMZ *ʔu:ʔpiw-ʔah ‘pick small objects (e.g. coffee beans)

   - PMZ *wocʔ ‘to puncture’ > MSAY woʔc ‘scratch, play guitar’, ZOCOP wohe ‘place stakes in the ground’, ZOFL wohe ‘to puncture, bite, sting’

m. *wahki ‘mash or grind thoroughly (corn dough)’ (diss. < *wohki) > MO awūüig
   - PMZ *woʔk ‘grasp a fistful of something’ > ZOCOP woʔk; MSAY woʔk ‘remove (a fistful of something)’

n. *i(h)ce-weka ‘monkey’ > MA uchwyak, MO echweak
   - PZOG *ʔu:cuʔ ‘monkey’ (< NAH ozomatli (vçomatli, oçomahtli, uzomatli) poss. > HUAS uθh)u)]
   - PMZ *wiʔyu.uk(s) ‘kinkajou (animal), Potos flavus’, Sp. mico de noche lit. ‘night monkey’ > MOLU viyuʔk, ZOR wiʔyu.uk, etc.

o. *caca ‘bramble’ > MO MA waj tsats (waj = ‘surface’)
*fan-caca* ‘itch’ > D MO arrantsats; MO rantsats ‘hives’
- pZo *cac* ‘crack’ vi.; PMX *ca:hc* ‘century plant, agave’ (spiny)
*ya-caca* ‘itch’ > F ayatsats; MA (yatsats) ‘pimple, pox’
- pMZ *yak-* ‘causative prefix’ or PMXO *yoʔc, yo’c ‘pierce’

p. *cihtu* ‘untie, let loose’
- pMZ *ko-ciʔt* ‘slip away’ > MTOT ku-ciʔt ~ kucit ‘dislocate’, ZOCOP kociʔt-u ‘escaped, got loose, got dislocated’

q. *aha, *(a)ha-ya, *(h)aya* ‘melt’
- pMZ *hi:yaʔ ‘melt; to cry’

r. *piwu, *pihi* ‘bud, sprout’
- pMZ *pihi(k) ‘flower’ > ZOCOP poʔu ‘budded, sprouted’, MSAY pih-p, MOLU pih-i

s. *pihtu* ‘rip out sewing; pick fruit’ & *poto* ‘rough’
- pMX *poht* ‘tear something long and thin’ > MTOT poht ~ po’t ‘break, e.g. rope’, MTLC toht ‘to burst’, MSJP poht ~ po’t ‘break (e.g. rope, vine, chain)’
- pMZ *po:ʔt* ‘cut with machete’ > MIXISTLÁN MIXE po:t, MSJP po:t ~ po:t ‘chop wood’ [JS, in part]

4.2. Mixean source

(22)a. *awawa* ‘annatto’ > D [[awaw]]
- MOLU ʔa:wowa ‘annatto’
- cf. TTNP (ahuáug) ‘annatto’ (Garcia Vidal & Garcia Garcia 1972)
b. *pici* ‘yellow mombin’ > MO piüts; MO kants piüts ‘orange oriole’
c. *himbi* ‘to sweep’
- pMX *hin* ‘to scrub’ plus verbal suffix *-pa, e.g. MOLU -hi:m-pe ‘be scrubbing, scouring’ vt.
d. *(h)oyoko/*hiyiki* ‘ball’ > F D MA oyok, Mo ajoyok ‘make into a ball, roll up’
- pMZ *ʔuyuk* ‘bent, warped’ > MSAY *ʔuyuk* ‘curved’
e. *osiπi* ‘tomorrow’
- MOLU ʔušiʔp ‘in the afternoon or evening; it is late’; ZOCOP išoʔpiyi hama ‘later today’
- pMX *ʔV-šihw ‘yesterday’ > PMXO *ʔušiwh; MOLU ʔušivi ‘last night’
f. *piho* ‘sapodilla’ > F piuf : MOLU piho ‘yellow zapote’

4.3. Source in Oaxacan Mixe

(23)a. *wehka* ‘laughing falcon’
- pMXO *mak-wehkš-ν ‘turkey vulture’
• ZOChMG ʔawaktowa? ‘laughing falcon’
b. *pohco ‘smallpox; sacred, divine’ >
   MA manapojts ‘smallpox’
   MA tyempojts ‘church’, D [[tũmpoots]]; MO te(a)mpootts ‘in church’,
   MO (Monopostiae) ‘Enchanted Hill’ (place name), MO monopoots ‘church
   officers’
   F [[munapoc] ‘cedar, D manapojts xiel (RN), MA napojts xiel, MO monopoots
   xiül
• pMxo *pu"hc ‘grano de la piel’ < pMZ *pu:cʔ-(i) [JS]
☞ The connection between smallpox and the sacred developed from traditional
   Huave medicine, which classified smallpox as one of the “divine” illnesses,
   that is, caused by the will of God, as opposed to witchcraft or the victim’s behavior
   (Signorini 1979)
c. *mówo ‘grasshopper’: pMxo *mu”hc ‘grasshopper (small, green)’
d. *kepe ‘make incisions’ > D akep, Mo akepeap (< *a-kepe-pe)
   • pMxo *ke:ʔp ‘cut with scissors’
e. *pثن ‘soft, pliable’: pMxo *piʔŋ焉p ‘soft (pillow, etc.)’ [PR]

Some cases where PH *e corresponds to a different vowel in pMZ point to a
Oaxacan Mixe language where the verb stem displays apophonic alternations:

(24)a. *teye ‘stretch out, hang’
   • pMZ *tiy ‘stretch out, hang’ > MSAY MOLU tiy, Matamoros Mixe ti:y, te"n-p’ ‘to
   rock, sway’
b. *wёhke ‘mange’ > F wej, MO weaaig
   • pMZ *woʔk ‘move the hand in a concave position to pick something up or to
     scratch oneself’ (RZ) – influenced by pMZ *wi:yi ‘mange’ – ATITLAN Mixe wo:k,
     wोʔk-p’ ‘to scratch’, ZOChMG hup-woʔk-š ‘scratch or scrape the skin by pulling’
c. *meye ‘to sleep’
   • pMZ *ma:hʔ > COTZOCÓN Mixe ma’w, ma:p, ti:-mæ’y, etc. [PR, JS]

4.4. Zoque origin

(25)a. *tάcί ‘cocoplum’
   • ZOChMG tacuʔ ‘cocoplum’ < pMZ *taʔe(k)V(k) ‘jinicuil; inga’
b. *cepim ‘red and black wasp’ > MO chapen
   • pZO *cinu-pin ‘bee’ (‘honey-person’)
c. *ci-ти ‘broken, split, unsewn’ > F achiot ‘to tear, break’, MA achiet ‘break
   accidentally’, MO achiüt ‘to break’
   • pZO *ciχ ‘to scratch’ > ZOCOP ciχ- ‘to tear, break, scratch’
   • pZO *cih ‘to break’ > ZOFL cih- ‘get chipped’
d. *hак ‘owe money’: pZO *haʔc ‘owe’ > ZOCOP zoʔ haʔc-i ‘debt’
e. *nahα ‘black wax: pZO *naḥi > ZOChMG naḥi ‘wax; beeswax’
f. *kαhpa-kay ‘epidemic’ > MO kaabküy; MA (kahp kēy, kap kei) ‘fever, plague’
   • pZO *kaʔ-kay ‘sickness, death’
g. *hayak ‘Mexican beaded lizard’ > F jayaik, MO jeyak, jayak
   • pZO *pon-ha:yaʔ ‘salamander’
h. *tikay ‘few, a little’ > F tyukay, MA tyuküy, MO tegüy, D [[tiküoy]]
• PMZ *tik(ay) > SANTA MARÍA CHIMALAPA ZOQUE -tigay plural suffix
• PMZ *tuk ‘three’

i. *wici ‘orange oriole’ > MO wiüts
• ZOCOP wicu ‘tejocote (orange-colored fruit like mombin)’

j. *pâk ‘fish with a net’ > MO apak
• PMZ *ma:k? ‘wash nixtamal; fish with a net’ > A YUTLA MIXE mba:kɣɨ ‘fish it!’
  ma mbak ‘it was fished’, ZOTEX bak ‘to fish’

k. *sapani ‘canistel, white zapote’ > MO sapën
• PZO *sapane ‘sapodilla’

l. *tap ‘wart’ > PZO *tapu ‘wart’ > ZOCOP ZOFL tapu, ZOTEX ta:pi?

m. *haca ‘play the accordion’ > D (jahatshats)
• PZO *hec ‘to scratch’ > ZOCOP hehc ‘scratch, play (e.g. guitar)’, ZOFL hehc-u ‘play (the guitar)’

n. *k’alanga/*k’ilingi ‘to jingle, rattle’ > F akualangé ‘make a sound (like seeds in shell)’, MO akwalang ‘to jingle’, MO akwiling ‘to rattle, tinkle’
• ZOCOP kihling ‘to jingle’

• PZO *wan ‘sing’, PZO *wan-e ‘song’

p. *in(?) ‘rolling pin for a grindstone’ > MO end kow
• ZOCOP tza-une ‘id.’ < PMZ *?unV(k) ‘child’
  > EPICRAPHIC MAYAN (yu-ne) ‘child, baby’, CHUJ CHRT unen ‘man’s son’

4.5. Totonacan sources

A few loans from Totonacan sources appear to have passed into Huave:

(26)a. *cewa ‘atole’ > F jichaw, D chaw, MA jechaw, chaw, MO chaw, jachaw
  • TTNS <+chuj~chau>, TTNX <+chau> čauh ‘tortilla’, cf. MŠAY -tsaw- ‘make (tortillas)’

b. *chiyi ‘mouse’ > D MO chiy

c. *piwi ‘daughter-in-law’: see §4.6

4.6. Kinship terminology from Mixe-Zoque-Totonaco

A large number of Huave kinship terms resemble those of MZ (and Totonaco in some cases):

(27)a. *piwi ‘daughter-in-law’ > D piw, MA puw, MO -pew; F puy ‘daughter-in-law; woman’s mother-in-law’

b. *sihe ‘old man, grandfather’
  • PMZ *cuʔ-si ‘woman’s father in-law’; MOLU cuʔshi ~ cuʔši, ZOCOP cuʔši; but cf. also šits ‘uncle’ in San Agustín de Loxicha Zapotec (Sierra Sur) (Mikko Salminen, p.c.)
c. *teye ‘younger brother’ (vocative) > Mo teay
   • PZO *tiwi ‘brother’ > ZOCOP tiwi ‘friend, companion; relative’ (affectionate vocative); ZOR tiwi ‘friend, companion, son (addressing affectionately)’

d. *mindt ‘woman’s last child’ > Ma munday, Mo-mend
   • MSAY miʔt-na ‘man’s father-in-law’, MOLU muʔt-naʔuʔw
   • In the PH kinship system, as in many languages in the region, the same term is used for son-in-law and father-in-law (likewise for daughter-in-law and mother-in-law). Thus ‘woman’s last child’ could plausibly develop as follows: ‘father-in-law’ > ‘son-in-law’ > ‘‘newest” son, in virtue of daughter’s marriage’ > ‘youngest son’

e. *cihki ‘younger sibling’
   • MSAY máhcɨk, MSAY makciʔk ‘younger brother’, MSAY čičik ‘little’; cf. PZO *čiks ‘little’ > ZOCOP čiks

f. *kici ‘skinny; child’ > MA MO kich ‘child’; Mo nekich ‘skinny’, MA ñikich
   • MSAY kiʔč ‘boy’, MSAY kiʔčway ‘child’ (unknown etym.)
   • TTNK kišːswa ‘little and ripe, but underdeveloped’ [JS]

g. *nasɨ ‘girl’: PMX *niːʃ ‘daughter’ [PR]

h. *apa ‘woman’s father-in-law’ > F ap: PMZ *ʔapu ‘grandfather’

i. *haya ‘consuegro’ (one’s child’s father-in-law) > F hay ‘one’s child’s mother-in-law’, MA MO jüy ‘one’s child’s spouse’s parent’, D [[hiy]]
   • PMZ *hayá(w) ‘man’ > ‘husband’: ZOCOP ZOR hayah, ZOCtMG haya
   • PMZ *hiyi ‘man’s brother-in-law’

Radin (1916) first noted this resemblance in kinship terms, taking it as a sign of a Mixe-Zoque-Huave genetic relation. If, however, these resemblances result from interlanguage contact, we might reasonably conclude that they arose through frequent intermarriage between the two communities. Support for this conjecture comes from the semantic changes observed in the borrowings. Specifically, in several cases (30 b, d, h, i) a MZ source word for a blood relation corresponds to a PH etymon for a relative through marriage (or vice versa). For example in (30 b) PH ‘old man, grandfather’ resembles MZ ‘woman’s father-in-law’: a Mixe-Zoque woman with a Huave husband might address her father-in-law with *cuʔ-si, the meaning of which would then be transferred to ‘grandfather; old man’ in Huave.

5. Zapotec sources

It is hardly surprising that there are a good number of recent loans from ZPIST to Huave given that the two speech communities are now adjacent and have long had important commercial ties. More interesting however is that certain other loans have no plausible source in ZPIST, and instead resemble proto-Zapotec or dialects of the Sierra Sur:

(28)a. *kiti ‘hen’ > D kity, Mo kit
   • PZp *gidi

b. *sena ‘sir’ > Mo xan; Ma tyety xan ‘boss’
• PZP *šana ‘sir’
c. *konci, kinci ‘to mix, grind’ > F kunché ‘to grind’, MA akunch ‘grind (small object)’, Mo nekiouch kants ‘grindstone’
• PZP *koʔonča ‘to mix’ [SZ] > ZPIST ru⁴guva⁴ča⁴, Coatlán Zapotec ngo‘ča

d. *yawa ‘swamp (Sp. estero)’ > D MA yaw; F Tiyaw ‘Puerto Estero’ (lit. ‘in swamp’)
• PZP yawu ‘river’

In (28a) for example, no reflex of PZP *gidi exists in ZPIST; in (28b) the ZPIST form ‘šuʔa⁴na⁴’ ‘patriarch, matriarch, person responsible for a festive event’ reflects PZP *šuwaʔana instead of *šana, which must be the source of *sena; in (28c) only PZP *koʔonča has the nasal of *konci.

This finding supports the view that there were early contacts between Huaves and a southern Zapotec population different from the ancestors of the current community of the Isthmus, who arrived in the region only shortly before the Conquest.

6. Huave as donor language

There are few clear cases in which Huave is the donor language instead of the receiver in a borrowing. That the two plausible cases in (29) are both names of fish is not surprising since fishing is the basis of the Huave economy and the Huaves undoubtedly traded their catch with peoples living further inland:

(29)a. *cili ‘black mojarra’
> ChO ā-atsili ‘mojarra’
b. *mili ‘lisa’ (fish)
> ZPIST mi⁴l⁴ (no other Zapotec cognates)

7. Ambiguous sources: Diffusion and Wanderwörter

Finally we turn to areally diffused vocabulary. At least half of such cases can be traced to MZ etyma which spread to Huave either directly or via another language, often Mayan:

(30) Diffused from Mixe-Zoquean
a. *pomo ‘copal’ < PMZ *po:m(o) ‘copal’ > pMA *po:m (TK) [JS], CHO boma
b. *timi ‘mofin (fruit)’ < PMZ *tu:ni ‘plum-like fruit’
> ChO ā-dumi ‘tree that produces a fruit called bobo’ (type of mofin)
> HuAS ā-tnn ‘mofin’
c. *paci ‘lizard’ > MA tarr püch ‘lizard-like reptile’, D torr püch ‘long-tailed iguana’
• PMZ *paci ‘lizard’ > YUC ā-pach ‘type of crested lizard’
> ChO bā’isi? ‘chameleon’
d. *ceka ‘woodpecker’
• PMZ *cehe ‘carpenter’ > ZOCOP ceʔ ‘woodpecker’, MOLU ceh-oʔk
> pMA *čehe-(C) ‘woodpecker’ > CHOL x-ch’ejku, etc.
> ZPIST čaʔkaʔ ‘woodpecker’
e. *pīpi ‘to blow’ (poss. redup. of *pi-pi) & *pih ‘wash a little’
   - PMXO *pōh ‘wind’ [PR]
   - PMZ *puh ‘to wash’ (?) > ZOChMg puh ‘to inflate, blow’, ZOCOp puh ‘blow (e.g.
     water on fire to put it out)’
   F tokats, MA tokots, dim. tyukuch, MO tokots, dim. tekech, D tokotson uleyewi
   ‘short (in stature)’ (RN)
   - PMZ *tuk ‘pick fruit’ > ZOChMg tuk; MSAY tuk ‘pick (coffee, oranges etc.)’,
     ZOCOp ho-tuk ‘break into pieces, tear’, ZOChMg to-yuk ‘slice with a machete’
   > CHOL tuk ‘pick (fruit, coffee)’, YUC t’ook ‘to harvest fruit’
g. *sāhk ‘medicine’ > MA sai(j), MO süüg, F ūurang saj ‘folk healer’,
   D ūuransújk ‘doctor’
   - CHLT (čāk) sak ‘medicine’ < PChol *čāk (< MZ) [JS]
   ☞ Ultimate source is MZ, but likely arrived via Mayan; the *s is unexplained, unless
   from CHLT
Other cases are more ambiguous and for these Wanderwörter we cannot offer a
hypothesis for the originating language:

(31)a. *ceka ‘bad sign’ > D [[acak]], MA achake, achákan
   - PChol *č’āk ‘to wound, injure, bewitch’ > CHOL ch’āk ‘to curse’, CHOL ch’āk-
     oñel ‘witchcraft’, CHRT (čhek) ‘image, reflection; image used by a shaman; signal,
     sign, portent, symptom, doll’, CHLT (chacta) ch’akta ‘wretched’
   - PMXO *čiʔki ‘fear, fright’, MTOT ci’ga
   - ZOR, ZOCOp yača?kuy ‘evil, perversity’ (← yac-yak< ‘to cause or do ill’), cf.
     also ZOCOp čʌkhayu ‘s/he harmed’
   ☞ Unusual absence of word-final truncation in MA acháke suggests late borrowing,
     but we expect prenasalization if this is a direct borrowing from Ch’olan.
     Nevertheless a MZ source is also possible.

b. *wēka ‘horn’
   - PMA *u:k’a: > JAK QAN KCH uk’a?, MAM uuk’a [JS]
   - ZOCOp weka? (!)

c. *cīł ‘urinate’
   - PMAO *ču:l ‘urinate’ (diffused) > TOJ CHUJ KAQCHIKEL chul [FB, JS]
   - TTNPs 〈tzulu, tzuluβ〉 ‘urine; urinate, TTNP 〈tzulu, tzuluβ〉

d. *tisīmi ‘shrimp’
   - CHO 〈dixmi〉 ‘sea shrimp’
   - PMAO *čoʔom ‘shrimp’
   - PMXO *kiʔs ‘sea shrimp’ [JS]
   - YUC xex, PChol *šeš
   - MTAP (xuxi), CHOL xux

e. *pahtema < ? pre-PH **pahti-tma ‘calabash tree’ > MO napajteam, F napatiam
   - PMA *pa:t ‘back, bark’ > CHOL (pat-tie, patie) pat te’ ‘bark’
   - PMX *cima ‘gourd bowl’ > PMA *cima< (?) ‘gourd bowl’ > HUAS tima?, TZO TZEL
     QAN ACA JAK tizima
   • YUC (cox) ‘another type of pheasant’, CHRT (ah kox) ‘large-plumed and
     brightly-colored bird’, ITZA (HF) CHOL (†kox ‘crested guan (bird)’; CHOL (chan-
     wox ‘spotted wood quail’; LAC kutz ‘wild turkey’
   • NAH {{coxolitle}} ‘pheasant’
   • MTOT kuš’ohk ‘bobwhite, quail’, ZOCOP ku?ši-hon ‘quail’ [JS]
g. *yo(h)ko ‘joint (of the body)’
   • PMZ *yoʔk(-tu) ‘neck’
   • PMA *ʔo:q ‘foot’
   • CHOL †ahok ‘neck’
    h. *lopo/*lippi ‘to wet’
    • CHIC (lop) ‘wet’; HUAS (lup-el) ‘sink’ vi.
      ☞ poss. ZPAT lu³ppaʔ¹ ‘moist’, ZPIST na⁴-gu⁴-pa ‘moist (from night air)’
i. *tipi taku ‘fodder, sedge; soaproot’ > MA tyup talk, MO tiptúik; D tyup tük
     ‘jointed flatsedge’
    • PMACTR *tyup-ag ‘soaproot’ > SAKAPULTEK ch’ip-ag; TZEL ch’up-ak(’) ‘soap’,
      TOJ ch’up-ak, KCH ch’ip-ag
    • PMZ *cipʔu ‘edible green’ > MOLU ciʔpi, ZOCOP ciʔ, MTOT ci”p
j. *pohpo ‘palm basket’ (cf. also MO nepoob ‘weak’)
   *pohpo sili ‘beach hibiscus’ > MO poob xiül
   *pahpa, *pohpo ‘stalk, beam, stake’ (*niši ‘palm’) > F puj ŋity ‘palm stalk’,
   MA paj ŋit, MO paab nit
    • PM *pohp ‘(rush) mat’ > CHRT (pohp) ‘sedge (tule), mat woven from sedge
      bark’, CHRT pojp ‘mat’; cf. also ZOMG pahpa ‘basket for beans’
    • PO *poʔwah ‘beach hibiscus’ > ZOHMG woppoʔkuy, ZOCOP poʔah
k. *yese ‘avocado’ > MA yex, MO yax
    • ZPIST ya⁴šu⁴ ‘avocado’
    • CHLT (yax) ‘dark blue, green, green fruit’, CHRT (yax)
      ‘green, light, fresh’
l. *pici ‘cottonseed’ > MO pich; MA MO mipich sow ‘white specks in pork that
   indicate trichinosis’
   • YUC piits ‘cotton’
   • PMZ *pišt ‘cotton’
   • ZPIST biʔfu ‘cottonseed’
m. *peca ‘tortilla’
    • PMAOCC *paʔv ‘tortilla’ > CHOL *pac ‘bean tamale’ > CHOL TZEL patz’;
      CHLT (pech) ‘press with the hands to make tortillas’, CHOL pechan ‘make
      tortillas’ (BS)
    • PMZ *pići ‘leached cornmeal, nixtamal’
      ☞ cf. proto-Uto-Aztecan *paʔt-i/a ‘corn cob, grain of corn, seed’, poss. >
      TTN paʔsma ‘corn cob’ (Hill 2006)
n. *caka ‘thigh’ > MO MA tsak; F D tsak ‘leg’
   • LAC ([ʔu-čak-bák-e:ɾ]) ‘his/her leg, thigh’, YUC (čak bak, čak-bak-el) ‘thigh’
     (Ticul, Motul)
   • cf. TTNP (ch’a:ke:-n) ‘thigh’, TTNX (chēkē-n)
8. Conclusion

The Huave community is frequently alleged to have migrated in the early post-Classical period (c. 1100 CE) to their present location from some southern location such as Nicaragua or even Peru. As Hernández Díaz & Lizama Quijana (1996) show, however, these largely groundless conjectures by earlier scholars entered into the popular consciousness of the Huaves and then were reinforced after being repeated to ethnographers. For this reason an empirical basis for the pre-conquest history of the Huaves must now rely only on archeological and linguistic data.

The contribution of the data from interlanguage contact to this debate remains somewhat open. Nevertheless the sheer quantity of borrowings, possibly approaching a quarter of the Huave vocabulary, speaks to an intensity of interaction between the Huaves and speakers of Mayan and Mixe-Zoquean languages in particular.

It is also certainly significant that most loan words from Mayan come from Ch’olan sources; that many closely resemble more archaic representatives
(geographically remote Ch’orti’ and extinct Ch’olti’) supports the hypothesis that these languages were a *lingua franca* of the Mayan elite during the period of greatest contact with Huave speakers. Nevertheless, loans from Yucatecan and from other Mayan sources (Huastecan and diffused Eastern Mayan) are also represented. Two layers of borrowings from Mayan were identified, based on the manner in which ejectives and implosives are adapted in proto-Huave; this may indicate a long period of interaction or various indirect routes of diffusion to the Huave zone.

Loans from MZ sources are nearly as numerous as from Mayan sources; they include not only vocabulary diffused early on from PMZ, but also direct loans from every subpart of the family. Specific kinship term loans from MZ sources are best explained by an early period of frequent intermarriage between the two communities. Borrowings from the Veracruz Mixe languages, such as Oluta Popoluca – known for its exceptional archaism with respect to PMZ – are particularly striking and numerous. More research will be required to determine if the Huaves were once in close contact with the ancestors of Oluta speakers or if in fact these borrowings took place as early as the proto-Mixe-Zoque epoch. Either scenario, however, would require a significant revision of the received view of the sociolinguistic circumstances of the Isthmus in the Classic and Pre-classic periods.
References


Appendix

A. Interpretation of practical Huave orthography

Each dialect of Huave has its own practical orthography. The following equivalences are true for all four systems unless indicated otherwise: x /s/ [ʃ]; ch /ts'/ [tʃ]; j /h/ [h ~ x]; ts [ts]; mb [mb]; nd [nd]; nts [nts]; F MA MO nch nts'/ [ɲtʃ]; D ndx /nts'/ [ɲdʒ]; ng [ŋ]; kw /kʷ/; ngw [ŋw]; ü /ɨ/; F MA D ŋ /n/ [ɲ ~ n]; f [f]; D yu [ʊ]; D yue /jue/ [ue]; MA uo [uo]; D uo [uø]; D MA ie [iɛ ~ iɛ]; MO iü [iɪ]; MO iow [iøw]; F fu [iu]; F io [io]; F ia [ia]; F MA ai [ai]; rr [r]; F MA D r [r]; MO r [r] or [ɾ] between vowels where it is always [ɾ]; D MA F y (following a consonant) represents secondary palatalization; MO eo, io [ø]; MO ea, ia ['a]; MO oe, oi [ø] before palatalized coda; MO ae, ai = [a] before palatalized coda.

B. Language abbreviations and default data sources

1. Huave

Unless otherwise specified, historical data are from Peñafiel (1886).
F San Francisco del Mar Yuni Kim, field notes
D San Dionisio del Mar Mikko Salminen, field notes
MA Santa María del Mar Rolf Noyer, field notes
historical: Belmar (1901)
MO San Mateo del Mar Stairs & Stairs (1981)

2. Proto-languages


PMA Proto-Mayan
PMABAJ Greater Lowland Mayan
PMACTR Proto-Central Mayan
PMAOCC Proto-Western Mayan
PMAOR Proto-Eastern Mayan
PYUC Proto-Yucatecan
PCHOL Proto-Ch’olan
PMZ Proto-Mixe-Zoque
PMX Proto-Mixe
PMXO Proto-Oaxaca Mixe
PZO Proto-Zoque
PZOG Proto-Gulf Zoque
PZP Proto-Zapotec

3. Mayan languages

Unless otherwise specified, contemporary data is from Kaufman & Justeson (2003) and historical data is from Dienhart (1997):
HUAS Huastec
CHIC  Chichimuceltec
YUC   Yucatec Mayan contemporary: Gómez Navarrete (2009)
LAC   Lacandon
MOP   Mopan
CHT   Chontal de Tabasco
CHOL  Ch’ol contemporary: Aulie & Aulie (1978)
historical: Hull (2005)
                     historical: Wisdom (1950)
CHRT  Ch’orti’ historical: Hopkins, Josserand & Cruz Guzmán (2011)
                       contemporary: Hull (2005)
CHLT  Ch’olti’ Stross (2007)
TZEL  Tzeltal
TZO   Tzotzil Delgaty & Ruiz Sánchez (1978)
TOJ   Tojolab’al
QAN   Q’anjob’al
JAK   Jakaltek (Popti’)
KCH   K’iche’

4. Mixe-Zoque languages

Unless otherwise specified, data is from Wichmann (1995):

i. Mixe

MTOT  Totontepec Schoenhals & Schoenhals (1965)
MTLC  Tlahuitoltepec
MSJP  San José El Paraíso
MOUL  Oluta Popoluca Zavala Maldonado (2000; n.d.)
MSAY  Sayula Popoluca Clark (1995)
MTAP  Tapachultec Sapper (1929)

ii. Zoque

ZOTEX Texistepec Harrison, Harrison & Garcia H. (1981)
ZOCOP Copainalá Engel & Engel (1987)
ZOFL  Francisco León Rayón Harrison & Harrison (1984)
ZOR  Rayón Harrison & Harrison (1984)
ZOCHMG San Miguel Chimapan Johnson (2000)

5. Zapotecan languages

Unless otherwise specified, data is from Fernández de Miranda (1995):

ZPZGO Zoogocho Long & Cruz M. (2000)
ZPAT  Atepec Serrano
ZPIST Isthmus (Juchitán) Pickett (2007)

6. Other languages

CHO   Highland Chontal Turner & Turner (1971)
TTNS  Sierra Totonac Aschmann (1962)
TTNX  Xicotepec Totonac Reid & Bishop (1974)
TTNP  Papanlla Totonac Aschmann (1973)
TTNN  Upper Necaxa Totonac Beck (2011)
NAH   Classical Nahuatl Wood & Sullivan (n.d.)