Skua (*Catharacta, Stercorarius*) occurrence in the OSME Region

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Figure 1. Map of the OSME Region (as of 2007).

Records of skua (*Catharacta, Stercorarius*) occurrence in the OSME Region come from a wide variety of sources. Those we found in the English language are diverse, but those in the languages of the Region have been difficult, if not impossible, to consult until recent years. The geographic definition of the OSME Region now includes the Caucasus and Central Asian Republics, the majority of whose sources and of those in neighbouring Russia and Ukraine have been published only in Cyrillic languages. Offshore observations have been of particular value in suggesting passage trends. Overland passage from skua breeding grounds seems well established, probably as minor migration routes, representing a strategy that would balance better migration conditions against probably uncertain food supplies en route, whereas migrants travelling solely over the sea face poorer migration conditions but may have a guaranteed food supply. Observation of overland migration is rendered more difficult by the underlying trend of fluctuating skua numbers being in delayed lockstep with lemming population cycles. Overland migration between the breeding grounds and the open waters of such as the Aegean, Black and Caspian Seas and of the Gulf through to the Indian Ocean is substantiated by records. Other overland movements, such as across Turkey or eastern Saudi Arabia probably occur, but remain largely undocumented because of low observer density. Furthermore, skuas that do migrate overland probably perform loop migration in at least the southern part of their journey. The recent warming trend of the Holarctic taiga and tundra zones is likely to alter the composition and proportions of their biological communities in an unpredictable and complex way, and probably non-linearly.

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INTRODUCTION

The OSME Region has been interpreted as follows for these skua records (**Fig 1**). It includes a significant proportion of the eastern Mediterranean and includes Cyprus. The western boundary then follows the territorial line between Greece and Turkey right through to the Sea of Marmora, but includes European Turkey. The southern Black Sea is included, the boundary following the northern borders of the Caucasus states (Georgia, Armenia and Azerbaijan) and the Central Asian states in the Region clockwise to Afghanistan, exiting into the Indian Ocean at the easternmost coast of Iran. For this paper we include for simplicity the whole of the Caspian rather than following the OSME Region boundary through it from northernmost Azerbaijan to the Kazakhstan border where it adjoins Astrakhan. From the Iranian border a line due south on 64º20'E crosses a line that stretches eastward from the Somalia-Kenya border at 10ºN. For this paper, records that occurred anywhere along the African coast from that point northwards, or in any part of the Red Sea are included. Beyond this area, any extralimital records that indicate a migratory movement of skuas to or from the OSME Region have been included, such as records of collected birds and observations in southern European Russia. The pattern of overland skua migration occurs both east and west of the OSME Region – examples are cited.

Meininger & Sørensen (1986), prompted largely by the skua data for Egypt being obtained for *The Birds of Egypt* (Goodman & Meininger 1989), examined skua occurrence in the Middle East, but were hampered by the paucity of data available, except for those from Eilat, and so had to concentrate on the area centred on Sinai.

Now that more data are generally accessible, particularly from Cyrillic–language papers, and that many more birdwatchers now record bird species across the OSME Region, it seems opportune to revisit the subject of skua occurrence. Skua taxonomy has developed from Furness (1987) through Malling Olsen and Larsson (1997), but we consider that the approach of (Cohen *et al* 1997) on skua phylogeny, which revised the relationships of all skua taxa further, a process refined by Andersson (1999), offers the best comprehensive assessment, although we are aware that there are other arguments, *eg* Braun & Brumfield (1998). We follow Sangster *et al* (2004) and Dudley *et al* (2006) in our treatment of all skuas within a single genus *Stercorarius*. Furness (1997) and Furness & Mineyev (1997) succinctly summarised knowledge of skua breeding dynamics in Europe. Snow & Perrins (1998) produced a comprehensive account of what was known about skuas in the Western Palearctic, largely in line with the worldwide coverage in del Hoyo *et al* (1996).

Although to some extent we aim to update Meininger & Sørensen (1986), we also examine briefly the effect of food availability on skua breeding success and numbers on migration, the possible origins of long-distance overland migration, and the putative impact of a warming global climate on tundra-breeding species. Like Meininger & Sørensen (1986), we deal primarily with two species, Pomarine Skua *Stercorarius pomarinus* and Arctic Skua *S. parasiticus*. We use the catch-all term 'skua' in this paper for reasons of simplicity, where others quite reasonably have opted for 'jaeger' elsewhere. Similarly, we retain the older British-English names.

SKUA RECORDS – SOME LIMITATIONS

From the standard literature, it is not a straightforward task to determine the status of skuas away from the breeding grounds or the most-watched migration routes. The new boundaries of the OSME Region compounded our difficulty. The Birds of the Middle East field guide (Porter *et al* 1996) aligns largely with the earlier extent of the OSME Region (omitting the Caucasus and Central Asian republics) and does not map any skua species' occurrence. Although Snow & Perrins (1998) cover Turkey and the accounts by Furness (1997, 2002a, 2002b) and Furness and Mineyev (1997) do refer to overland movement from the tundra breeding areas, there is little detail in these sources and for most of the present OSME Region, information was lacking. Accordingly, we have depended heavily upon the relatively few detailed papers dealing with skua records (*eg* Meininger & Sørensen 1986 for Sinai and Abuladze 1998 for the Black Sea coast of the Caucasus), upon extracts from or translations of reports or papers (*eg* Mohammad Sehatti-Sabet *in litt*, Iran midwinter waterbird counts), birdwatching records (*eg* Richardson 1987-2002, UAE; Hellyer *in litt*, Oman) and upon Internet information.

Many reports and other accounts and descriptions of seabird sightings lack rigour, notable exceptions being Bourne (1991) and Bourne & Casement (1996). Because many sources provide but brief summaries without the full descriptions of the birds or of the weather at the time, and because Internet information is essentially ephemeral and often presented without objective review, we have interpreted material with a considerable degree of caution. Nevertheless, some conclusions can be attempted from its analysis. Identification of skuas in flight is far from straightforward, but some individuals amongst southern hemisphere skuas (Cohen *et al* 1997) come from hybrid populations. Ageing and indeed separating the immatures of some species remains fraught with difficulty in all but the best light and at relatively close range. We had to keep these aspects in mind when reviewing records and reports. Another problem, beyond the scope of this paper, may lie in the accuracy of museum labelling of some skua specimens (WRP Bourne pers comm).

INFORMATION SOURCES

The Royal Navy Birdwatching Society (RNBWS) database is a large source of (mostly) seabird records, covering some 60 years of sightings from naval and merchant ships on the world's oceans and seas, mostly but not exclusively from their membership; we have examined and extracted skua records for the OSME Region as defined above. Traditional literature sources consulted certainly provided essential background information, but often contained discouraging terms such as 'little studied'. Fortunately, birdwatching societies, groups and individuals have supplied much valuable information. Unpublished information from notes of varying antiquity have informed our investigation, as has Internet information, but often the best help and insight have come from the generous amount of time given by so many people to debate and discuss skua behaviour and the factors affecting it. We have obtained additional data from sources in Turkey, Bulgaria, Russia, Cyprus, Georgia, Azerbaijan, Astrakhan, Kazakhstan, Iran, the United Arab Emirates (UAE) and Oman. However, much of the ground we cover here was originally covered by Meininger & Sørensen (1986).

SKUA MIGRATION PATTERNS

Whatever skua migration routes and patterns exist, as known from observation or surmised from records, they must be set in the twin contexts of how they arose and how persistent they are. The current migration system in Europe, which emerged from the last ice age (15 000BP) is still developing, to quote Berthold (2000). Where skua breeding grounds were at that time is open to conjecture, as is where skua breeding grounds will be if climatic warming continues.

Following Berthold (2000), we avoid where possible the terms 'autumn migration', 'spring migration' and 'winter quarters' because they cannot easily be applied to migratory southern-hemisphere species, which feature in a minor way in this paper. We use 'outward' and 'return' migration and 'goal area'. The data we have obtained shed only a little light on whether some or all skua species have goal areas in warmer oceans that the majority of outward migrants reach and remain within, or whether a broad dispersal occurs at some time near the end of the outward migration. It is also not clear whether some or all skua species have 'retarded-return' or 'graded-return' migration strategies by immatures. The former is the continued presence of non-breeding immatures in a goal area or within a relatively narrow latitudinal band and the latter is the appearance of immatures regularly along part of the return migration route. However, the main thrust of Berthold (2000) is that migration is under endogenous impulse and control (which would tend to diminish our hypothesis below that lemming availability has an effect on the proportion of Pomarine Skuas migrating by sea-routes). The tendency for overland routes may have originated from ancestral skua spp that had no sea-route to use until the end of the last ice age, when the innate adaptive skua behaviour in seeking breeding areas close to the best available food supplies developed in the post-breeding period into utilising food sources near open water. As birds hunted gradually further, they could change their outward migration through experience (adaptive navigation, Berthold 2000)

For tundra-breeding birds the term site fidelity cannot apply in the same way as for temperate species, but Pomarine Skua is probably site-faithful incidentally, when lemmings are present in sufficient numbers. Arctic Skua, having more catholic tastes than Pomarine, and the much more omnivorous Long-tailed Skua *S. longicaudus* probably express greater site fidelity. It is possible that the paucity of overland records of Long-tailed Skua is linked to site fidelity because the benefits of migrating largely over sea routes are greater for site-faithful tundra breeders, but if this be the case, it is

not a straightforward relationship, because Arctic Skuas are more commonly recorded as overland migrants than Pomarine.

Tundra-breeding skua species occupy breeding areas where environmental conditions are particularly erratic, a condition common to many species that display nomadism (Berthold 2000), but being highly migratory with later maturation and being long-lived, the skua species' low annual reproductive potential might make them prone to nomadism only from their goal areas. Certainly this is one possible explanation why so many offshore oceanic records are not only widely distributed but are of very small numbers, but the lack of differentiation in the records between adults and immatures obscures the picture. The mechanism for such nomadism probably cannot be defined as true 'pursuing movements' to follow food supplies, but searching for food is almost certainly a factor.

Theoretically, escape movements (*eg* being driven off the breeding grounds by early onset of winter) might cause more individuals to migrate by alternative routes, but precisely which years had this effect is not known, making correlation with the sparse data on skua overland movements impossible. Yet another area of data shortage is the extent to which the timing, duration and distance of outward migration differ between juvenile and adult skuas. From the number of midwinter records, it is also possible that partial migration, where a proportion of the population do not continue to the 'goal areas', is a common phenomenon amongst northern skuas, especially if at higher latitudes winters are not severe, but distinguishing between partial migrants, retarded-return immatures or nomadic individuals is not possible from the mass of records.

The data are insufficient to confirm suspicions that loop migration might explain some of the disparities in some locations between the total number of skuas observed on outward and return overland migration. On the other hand, loop migration may occur only at certain locations where geography tends to funnel birds on to a different course (*eg* on return migration, north up the Gulf of Aqaba, and further east, north over Iran near Bandar-e Abbas, Hormozgan Province, where the Strait of Hormuz turns west-southwest), or it may be opportunistic, when conditions are suitable.

OVERLAND AND RELATED MOVEMENTS

We make the assumption that most if not all skuas recorded in the Red Sea and the Gulf belong to a migratory population that when mature enough to breed, travels and from to the Arctic breeding grounds overland. This assumption is based on the timings and directions of movement of the peak numbers of sightings, which align better with overland post-breeding (outward) and pre-breeding (return) migrations than with birds that return to the Arctic via oceanic routes, either south past India and the Malaysian peninsula and then through the Bering Strait, or via the Cape of Good Hope and north through the Atlantic past Cape Fear of northern Norway. Of course, non-breeders will wander, some certainly oversummering in seas of the OSME Region.

RUSSIA AND THE NORTHERN AND CENTRAL CASPIAN-BLACK SEA REGION

In the OSME Region, the skua species mostly involved in overland migration are Pomarine and Arctic. Long-tailed Skua is recorded as an overland migrant much less often, but it is more pelagic than its congeners (Furness 1996). Aspinall (2005) cited two recent (2002 and 2004) observations as being accepted as the first and second records for the Azerbaijan checklist. However, we have found overland and Caspian records going back to 1888 from Russian sources (see below). Moreover, WRP Bourne (pers comm) and Frank Ward (RNBWS pers comm) drew MB's attention to published (but perhaps not

well-circulated beyond seabird specialists) observations from 1997-8 from the oilfields in the central Caspian Sea that suggest a significant return migration (April & May) in one year (much reduced the next), but almost negligible outward migration in both years, the location being almost exactly half way between the Azerbaijan coast (the Aspheron peninsula) in the west and the Turkmenistan coast in the east (Bourne 1999, 2000).

More or less at the same time, we obtained supporting Oct 2004 and May 2005 Kalmykian data (Sergej Bukreev pers comm via Gadzhibek Dzhamirzoev) from slightly further north in the centre of the Caspian Sea. There were no outward migration records of any *Stercorarius* sp in October 2004, but in May 2005 Arctic Skua predominated, Long-tailed Skua occurred a few times and Pomarine only once. All observations were further than 25km from the shore. Arctic Skua was also the most numerous seabird in the central Caspian (Sergej Bukreev pers comm), sufficiently so for the movement to be classed as a 'well-expressed spring flyway'. Evidence of significant outward migration through the Caspian came from independent observations of Arctic Skua movements occurring in August 2005 (via Sergej Bukreev pers comm).

Relevant published Pomarine Skua records – Zarudny (1888, 1916), Khlebnikov (1928), Spangenberg & Feygin (1936), Smogorzhevsy (1959), Airumyan *et al* (1966), Scherbina (1977), Savitskiy & Poslavskiy (1977), Kostin (1983), Khokhlov (1990), Abuladze (1998), Savitskiy & Lebedeva (2003), Archives of the Bird Conservation Union (BCU) of Georgia (2003) and Arkhipov & Zhuravlev (in press) – are at **Table 1a**, and those for Arctic Skua – Zarudny (1888), Dementyev *et al* (1951), Zalataev 1953, Dolgushin (1962), Lugovoy (1963), Strokov (1974), Gubin & Levin (1980), Kalabin (1984), Krivitsky *et al* (1985), Shevchenko *et al* (1993), Abuladze (1998), Eskelin & Tolvanen (2000), the Archives of the BCU of Georgia and of the Zoological Museum of the Moscow State University – are at **Table 1b**. Sotnikov (2002) summarised Arctic Skua records 1990-7 (**Table 2**) in the Kirov Region (Middle Volga to Vyatka in central Russia) at about 56ºN, half-way between the breeding areas at 66ºN and the latitude (46ºN) of the northern Black and Caspian Seas. Records from Kostin (1983), Abuladze (1998) and Moseykin *et al* (2003) for Long-tailed Skua are summarised at **Table 3** and include an autumn vagrant (Sep 2002) in the landlocked Stavropol' Territory between the northern Caspian and the NE Black Sea. Khoklov (2000) recorded two Pomarine Skuas in the same Territory.

Excluding anomalous or insufficiently precise dates, **Tables 1-3** have a predominantly outward migration (post-breeding) bias. Conversely, the RNBWS database records (**Table 4**) for large numbers in the centre of the Caspian Sea suggest evidence of a sizable overland return migration to the breeding grounds. Turkmenistan records seem exclusively to be from the Caspian coast (Dement'ev 1952, Scherbina 1977). Validated Armenian records are scarce, the only skua observed in recent times being a juvenile Pomarine at southeast Lake Sevan basin on 7 Sep 2002 (Vasil Ananian, Pascal Wink & Roy Beddard pers obs). One Arctic skua was collected at Armash on 7 Apr 1989 (Vasil Ananian *in litt*). The first acceptable Armenian Pomarine Skua records (1966) are cited by Ayrumian *et al* 1968 (Vasil Ananian *in litt*).

Year-on-year variation in numbers may relate to tundra cycles (*qv*) of food availability the previous year in the breeding grounds. There are insufficient data to relate the numbers of skuas observed in our Region to tundra cycles, but of course in years where few birds have been observed in the Caspian in autumn, a low point in the tundra cycle might be the proximate cause. In the general area of the Caspian, we surmise that on migration most birds keep to the middle of the Sea, out of sight of shore-based observers (Scherbina 1977, RNBWS records, Sergej Bukreev pers comm),

Table 1a. Pomarine Skua *Stercorarius pomarinus* records from the Black Sea, the Caspian-Aral region and related regions (VA). **Key**: M = Migration season, O = Outward migration, R = Return migration, W = Wintering (probably)

Date	M	Place	Number	Reference, Source
Summer 1881	R?[1]	Lake Sulukol, Uralsk Region, Kazakhstan[2]	1 observed	Zarudny 1888
27 Apr 1907	R	Aralsk, Aral Sea, Kazakhstan	1 collected	Zarudny 1916
Sep 1915	O	Astrakhan Region, Russia	1 probable	Khlebnikov 1928
7-8 Jun 1928	R?	Aralsk, Aral Sea, Kazakhstan	1 observed	Spangenberg & Feygin 1936
Jun 1957	R?	Ukraine, Black Sea coast, Crimea	1 collected (8 June); some observed	Smogorzhevsky 1959
Aug 1958	O?	Ukraine, Black Sea coast, Crimea	Several observed	Smogorzhevsky 1959
25 Oct 1961	O	Ukraine, Black Sea coast, Crimea	1 observed	Kostin 1983
12 Aug 1965	O?	Ukraine, Black Sea coast, Crimea	1 observed	Kostin 1983
18&24 Aug 1975	O?	Ukraine, Black Sea coast, Crimea	1 observed each date	Kostin 1983
5 Sep 1976	O	Ukraine, Azov Sea, Sivash gulf	1 imm. collected	Kostin 1983
17 Aug 1966	O?	Armenia, Lake Sevan	1 observed	Airumyan *et al* 1968
Oct 1966	O	Armenia, Lake Sevan	1 subad collected	Airumyan *et al* 1968
6 Oct 1973	O	Chikishlyar, Caspian Sea, Turkmenistan	1 collected	Shcherbina 1977
27 Jun 1974	R?[3]	Chogray reservoir, Kalmykia, Russia	1 F ad collected, +3 observed	Savitskiy & Poslavskiy 1977
10 Apr 1977	R	Russia, North Caucasus, Stavropol region	1 observed	Khokhlov 1990
Nov 1983	O	Russia, North Caucasus, Stavropol region	1 observed	Khokhlov 1990
17 Jan 1992	W	Black Sea, Krasnodar Region, Russia	1 observed	Abuladze 1998
30 Apr 2002	R	Georgia, Black Sea coast (Batumi beach)	Solitary bird recorded	Archives BCU Georgia 2003
24 Nov 2002	W	Black Sea, Krasnodar Region, Russia	1 observed	Savitskiy & Lebedeva 2003
16 Oct 2006	O	Kazakhstan, Lake Shalkar-Karashan Aktubinsk region	1 subad observed	Arkhipov & Zhuravlev in press

Notes: [1] Late northbound return migrant, early (breeding failure?) outward migrant or non-breeder. [2] North of Caspian Sea. [3] As for **Note 1**.

Table 1b. Arctic Skua *Stercorarius parasiticus* records from the Black Sea, the Caspian-Aral region and related regions (VA). **Key**: M = Migration season, O = Outward migration, R = Return migration, W = Wintering (probably), ZM MSU = Zoological Museum of Moscow State University.

Date	M	Place	Number	Reference, Source
13 Oct 1885	O	Russia, Orenburg	1 observed	Zarudny1888
15 Aug 1890	O?	Russia, Astrakhan region	1 collected	Lugovoy 1963
23 Aug 1905	O?	Russia, Astrakhan region	1 collected	Lugovoy 1963
1 Sep 1921	O	Russia, Krasnodar region, Black Sea coast, Novorosiysk	1 collected	ZM MSU
4 Sep 1921	O	Russia, Krasnodar region, Black Sea coast, Novorosiysk	1 collected	ZM MSU
Aug-Sep 1936	O	Kazakhstan, Lake Chelkar	1 collected	Dolgushin 1962
28 May 1936	R	Kazakhstan, Lake Tengiz	1 observed	Krivitskiy *et al* 1985
Sep-Jan 1946-8	O/W	Russia, Krasnodar region, Black Sea coast	Single birds observed	Strokov 1974
23 Mar 1949	R	Turkmenistan, Caspian sea, Chikishlyar	1 collected	Dementyev *et al* 1951; ZM MSU
16 Jul 1951	O?	Kazakhstan, Caspian sea, Mangishlak	1 F collected	ZM MSU; Zaletaev 1953
3 Aug 1951	O?	Kazakhstan, Caspian sea, Mangishlak	1 juv collected	ZM MSU; Zaletaev 1953
3 Aug 1951	O?	Kazakhstan, Caspian sea, Mangishlak	1 F collected	ZM MSU; Zaletaev 1953
28 Oct 1955	O	Russia, Astrakhan region, Volga Delta	1 juv M collected	Lugovoy 1963
17 Jun 1959	R?	Kazakhstan, Lake Teniz	1 M collected	Dolgushin 1962
24 Aug 1976	O?	Kazakhstan, Ural river area	1 observed	Gubin & Levin 1980
9-11 Jun 1981	R?	Uzbekistan, lake Aydarakul	1 observed	Kalabin 1984
24 Jun 1982	R?	Kazakhstan, Ural river area	1 observed	Shevchenko *et al* 1993
15 Oct 1985	O	Kazakhstan, Ural river area	2 observed	Shevchenko *et al* 1993
11 Oct 1994	O	Georgia, Makhindzhauri, Ajaria	1 seen with Long-tailed Skua *S. longicaudus*	Abuladze 1998
2 Oct 1999	O	Kazakhstan, Lake Tengiz	1 juv observed	Eskelin & Tolvanen 2000
9 Oct 1999	O	Kazakhstan, Lake Tengiz	1 juv observed	Eskelin & Tolvanen 2000
9 Dec 1999	O	Western Georgia, Rioni River bank near Vani.	Found dead	Archives BCU Georgia 2001

Table 2. Arctic Skua *Stercorarius parasiticus* records, Kirov Region, Russia 1990-1997 (after Sotnikov 2002, via VA). **Key**: M = Migration season, O = Outward migration, R = Return migration.

Date	M	Event
18 May1990	R	Adult observed
01 Oct 1990	O	Adult observed
28 Aug 1993	O	Juvenile collected
23 Sep 1993	O	3 adults observed, 2 being collected
24 Sep 1993	O	2 adults observed
29 Sep 1994	O	Adult male collected
17 Oct 1994	O	1 observed
12 Sep 1995	O	4 (3 ad, 1 juv) observed
30 Sep 1995	O	5 (3 ad, 2 juv) observed
04 May1996	R	1 observed
16 Sep 1996	O	30 observed, mostly adults
01 Sep 1997	O	1 observed

Table 3. Long-tailed Skua *Stercorarius longicaudus* records in the Black Sea-Caspian Sea region, 1963-2002 (VA). **Key**: M = Migration season, O = Outward migration, R = Return migration

Date	M	Place	Number	Reference, Source
12 Oct 1963	O	Portovoe, Black Sea, Crimea, Ukraine	1 probable	Kostin 1983
8 May 1987	R	Near Rioni River mouth, Georgia	1 observed	Abuladze 1998
11Oct 1994	O	Makhindzhauri, Ajaria, Georgia	1 observed	Abuladze 1998
6 Sep 2002	O	Stavropol Region, Russia	1 M observed	Moseykin *et al* 2003

but only regular observations could establish the patterns. If during the return migration much of the movement is nocturnal, then the data at **Tables 1-3** do not necessarily conflict with those in **Table 4**. Some evidence discussed below may support this hypothesis. We surmise also that skua passage through the Gulf between the Straits of Hormuz and the river mouths at its head and through the Gulf of Oman (see below) may also occur mostly out of sight of shore-based observers. Recently, more pelagic trips are being undertaken into the Gulf of Oman, admittedly to search for petrels, but it would not be entirely unexpected if skua sightings rose sharply.

Eastern Central Asia and extralimitally towards Baikal and Korea and India

According to Gavrilov & Gavrilov (2005), Pomarine Skua has been recorded once at Lake Zaysan in easternmost Kazakhstan. Although this is accepted by Wassink & Oreel (2007), they include three other records (two collected in 1907 and one in 1928 from the Aral area and one from 1973 from north-central Kazakhstan. Arctic Skua appears to be a rare but regular passage migrant, more often seen in autumn (Gavrilov & Gavrilov 2005), including at the Chokpak Pass. Wassink & Oreel (2007) support that status, noting its occurrence from the east to the west of Kazakhstan. Rogacheva (1992) mentions Pomarine and Arctic Skua in the Yenesey mid-taiga (**Table 5**). Pomarine Skua is a very rare vagrant in Uzbekistan – Arctic (first recorded by Zarudny in 1916) is rare, but almost regular (Kashkarov & Ostapenko 1990). In the Baikal Region, observations and examination of old records revealed a consistent story: Gagina (1962), Izmailov (1967), Tolchin *et al* (1974), Melnikov (1998), Pizhyanov *et al* (1998) and Fefelov *et al* (2001) have recorded both species in small numbers, the outward migrants slightly in excess of the return migrants, but what is more interesting is that almost as many sightings are of birds in summer, probably non-breeders. There is one midwinter record (**Table 6**). It would seem that Baikal has adequate food supplies for skuas for much of the year.

Table 4. RNBWS records of larger numbers of skuas on passage in the Caspian Sea, 1997-98. **Key**: M= Migration season, R = Return migration.

Skua species	Coordinates	Location	Observer	Date	M	Total	Remarks
Skua sp	40:0:0.0N, 51:4:0.0E	Off Aspheron Peninsula	SJ Hingston	Apr 1997	R	117	117 in 18 days (*c*6-7/d)
Skua sp	40:0:0.0N, 51:4:0.0E	Off Aspheron Peninsula	SJ Hingston	May 1997	R	30	2/day for 15 days
Pomarine Skua	40:5:47.0N, 50:15:15.0E	Off Aspheron Peninsula	SJ Hingston	Mar 1998	R	13	
Stercorarius	40:5:47.0N, 50:15:15.0E	Off Aspheron Peninsula	SJ Hingston	Apr 1998	R	15	
pomarinus	40:0:0.0N, 51:4:0.0E	Off Aspheron Peninsula	SJ Hingston	Apr 1997	R	71	71 in 18 days
	40:0:0.0N, 51:4:0.0E	Off Aspheron Peninsula	SJ Hingston	May 1997	R	320	*c*21/day for 15 days
Arctic Skua	40:5:47.0N, 50:15:15.0E	Off Aspheron Peninsula	SJ Hingston	Apr 1998	R	11	
Stercorarius	40:0:0.0N, 51:4:0.0E	Off Aspheron Peninsula	SJ Hingston	Apr 1997	R	200	11/day for 18 days
parasiticus	40:0:0.0N, 51:4:0.0E	Off Aspheron Peninsula	SJ Hingston	May 1997	R	375	26/day for 15 days

Table 5. Records of Arctic Skua *Stercorarius parasiticus* and Pomarine Skua *S. pomarinus* in Yenesey mid-taiga 1974-1982 (Rogacheva 1992). **Key**: M = Migration season, O = Outward migration, R = Return migration.

Skua species	Date	M	Location	Number
Pomarine Skua	06 Jun 1980	R?	Sarchika River mouth, near Bakhta	1 observed
Pomarine Skua	05 June1981	R?	Yenisey, near Mirnoya	1 observed
Arctic Skua	14 Apr 1982	R	'mid-taiga'	1 observed
Arctic Skua	28 May 1974	R	On log floating in Yenesey	3 observed (1 collected)
Arctic Skua	29 Jun	?	'mid-taiga'	1 observed
Arctic Skua	After 29 Jun	?	'mid-taiga'	1 observed
Arctic Skua	After 29 Jun	?	'mid-taiga'	1 observed
Arctic Skua	25 Jul	?	'mid-taiga'	1 observed

Until recently it was not known for certain if skuas made overland passage in the easternmost Palearctic, because skuas were largely absent from Korean bird species lists (Moores 2004, Moores pers comm to MB). Tomek (1999) lists none for North Korea and Lee *et al* (2000) mentions only Arctic Skua as a vagrant for South Korea. However, Moores, while engaged in other ornithological research in Korea, had to undertake many ferry journeys and made many observations of skuas out to sea. He summarises his and others' observations (Moores 2004), and draws the conclusion that the pattern of observations suggests skuas (and other seabird species *eg* Black-legged Kittiwake *Rissa tridactyla* – Moores pers comm) are crossing the Korean peninsula to and from the Yellow Sea (175km). Moores also has recorded southern-hemisphere large skuas in Korean waters, noting South Polar Skua *S. maccormicki* but not Brown Skua *S. antarctica*, circumstances similar to those in the Arabian Sea (*qv*). In the Oriental Region as defined by the OBC in Inskipp *et al* (1996), the other skua spp expected are Pomarine, Arctic and Long-tailed. Further Pomarine and Arctic Skua records (2003–5) in Korean waters will appear in Moores (in press).

An account of an exhausted Arctic Skua on the beach near Chennai (Madras) on India's east coast (Aldridge 1997) reasonably surmises that the bird might have arrived overland from the breeding grounds, but did not discuss whether overland passage from India's west coast might have occurred. Perhaps the more likely explanation was that the bird was exhausted because of infection, and had simply come ashore. However, the RNBWS database has 16 Pomarine, a dozen Arctic Skua and some 20 skua sp records from the western coast of the Indian subcontinent (including one inland record approximately in northern Gujerat), but none at all from the eastern coast.

The Gulf – Iran

Individuals recorded in Iran in midwinter (**Table 7**) suggest that this behaviour is regular for small numbers, harsh winters permitting. The Iran Checklist (Scott & Adhami 2006) considers Pomarine and Arctic Skua as passage migrants and Long-tailed Skua as a vagrant. This Checklist includes Great Skua *S. skua* (the applicable records being from the earlier treatment of all large skuas as 'Great'), the authors surmising that the form occurring is likely Brown Skua *S. lonnbergi*, now treated as *S. antarctica*).

The Gulf – UAE and Qatar

The UAE has a long history of birdwatching, but more important, record-keeping has been extensive. The first Emirates Bird Report dates from 1987, and the Editor at the time of the 2002 issue, Colin Richardson, has provided (*in litt*) an extract of skua occurrences for that period. From September to January, sightings are fairly numerous and reasonably consistent, but, February is relatively quiet, and then from March to May there is a peak, activity decreasing sharply from June to August, July being the quietest month of all. **Fig 2** shows the general pattern of (mostly shore-based) recorded sightings per month. These data support overland passage north of Kuwait, but there is one short note that suggests overland passage across the Empty Quarter, *Rub al Khali*, may well occur. On four evenings in April 1993, a total of 75 Pomarine and Arctic Skuas was seen emerging from deep inland, crossing the shore at Dubai and heading northeast towards the Straits of Hormuz (Bannon 1993). From the subsequent direction of travel of these birds, Bannon (1993) suggests that they were heading from the northernmost reaches of the Straits of Hormuz, at which point the shorter route north would be over Iran, rather than turning southwestwards again to re-enter the Gulf towards the Shatt-al-Arab at its head. The implications are examined in the Discussion section below.

The Gulf – Oman and the Gulf of Oman

The Oman Bird Records Committee (OBRC) made available their database on skua sightings (Peter Hellyer pers comm). **Figs 3 & 4** give the pattern of Oman Pomarine Skua sightings (mostly shore-based) per month and the total numbers of birds per month, and **Figs 5 & 6** provide the same information for Arctic Skua. However, with only 5 OBRC records of Long-tailed Skua, that species remains a scarce vagrant to shore-based observers. The database also contains records of large skuas, namely Great Skua *S. skua*, South Polar Skua *S. antarcticus* and Antarctic Skua *S. maccormicki* (as *Catharacta* species). Views on skua taxonomy and English names have changed, particularly since 1987, which bedevils interpretation of older records. The corollary is that Great Skua *S. skua* is assumed to occur in the OSME Region only in the eastern

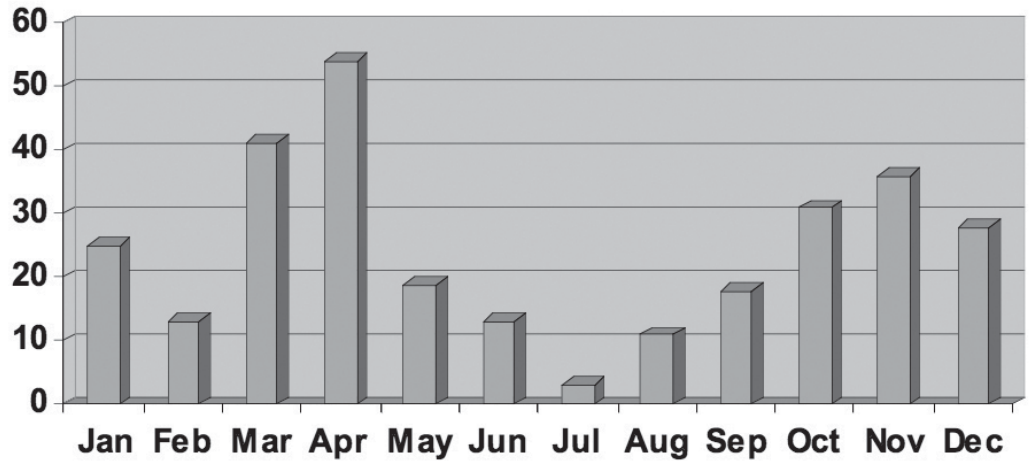

Figure 2. Yearly pattern of UAE recorded skua sightings (from data provided by Colin Richardson) 1987-2002. This chart does not take into account numbers of birds in any sighting, nor does it imply daily coverage year-round.

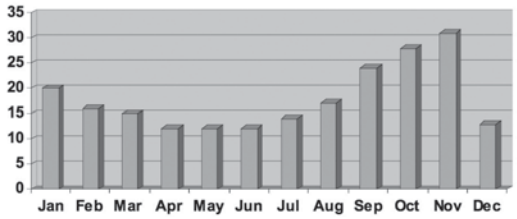

Figure 3. Yearly pattern of Oman Pomarine Skua *Stercorarius pomarinus* records (234) 1964-2005, covering 750 birds (from OBRC database).

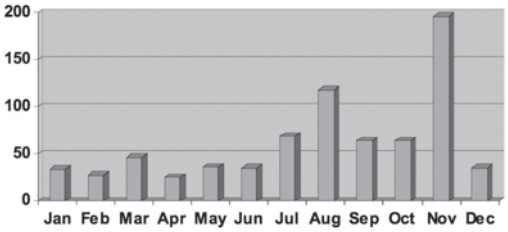

Figure 4. Month-by-month totals of Oman Pomarine Skuas *Stercorarius pomarinus* recorded 1964-2005 (from OBRC database).

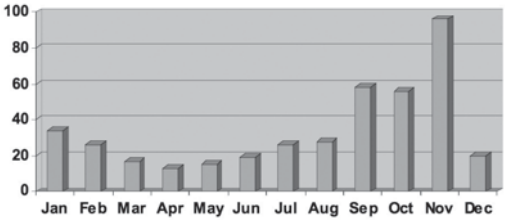

Figure 5. Yearly pattern of Oman Arctic Skua *Stercorarius parasiticus* records (408) 1962-2005, covering 1189 birds (from OBRC database).

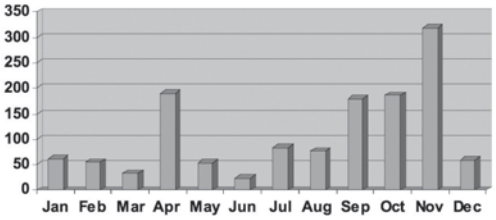

Figure 6. Month-by-month totals of Oman Arctic Skuas *Stercorarius parasiticus* recorded 1962-2005 (from OBRC database).

Table 6. Records of Arctic Skua *Stercorarius parasiticus* and Pomarine Skua *S. pomarinus* in the Baikal region, 1908-1992. (VA) **Key**: M = Migration season, O = Outward migration, R = Return migration, W = Winter.

Species	Date	M	Place	Number	Reference, Source
Arctic Skua.	Apr 1909	R	Transbaikalia, Bura river	1 collected	Gagina 1962
Arctic Skua	Jun N/K	R?	Transbaikalia, Muya river	1 observed	Izmailov 1967
Pomarine Skua	7 Oct 1908	O	Transbaikalia, Kitoi river	1 collected	Gagina 1962
Pomarine Skua	Summer 1952	R?	Baikal area, Irkutsk	1 collected	Gagina 1962
Pomarine Skua	23 Oct 1969	O	Bratsky Reservoir, Irkutsk Region	1 observed	Tolchin *et al* 1974
Pomarine Skua	13 Oct 1970	O	Angara river	1 observed	Tolchin *et al* 1974
Pomarine Skua	16-17 Jun 1972	R?	North Baikal	1 ad observed	Tolchin *et al* 1974
Pomarine Skua	1 Jun 1984	R?	Baikal, Olkhonskie vorota	1 observed	Pizhyanov *et al* 1998
Pomarine Skua	12 Sep 1987	O	Baikal, Selenge Delta	1 juv observed	Fefelov *et al* 2001
Pomarine Skua	28 May 1987	R	Northern Baikal	1 observed	Pizhyanov *et al* 1998
Pomarine Skua	25 Jan–mid Feb 1988	W	Baikal	1 ad observed	Melnikov 1998
Pomarine Skua	17 Jul 1989	R?	Baikal, Selenge Delta	1 ad observed	Fefelov *et al* 2001
Pomarine Skua	8 Jun 1992	R?	Northern Baikal	2 observed	Pizhyanov *et al* 1998

Mediterranean and the Black Sea as a vagrant. The easternmost recovery of a British-ringed Great Skua, an immature, comes from near Volgograd, between but north of the Caspian Sea and the Sea of Azov (Furness 2002b). All sightings and records of large skuas elsewhere in the Region are regarded here as pertaining to southern hemisphere skuas, either as true vagrants or as juveniles and immatures on dispersal. Consequently, the strongest evidence to refute this assumption would be if Great Skua mtDNA is eventually obtained from analyses of 'large skua' feather or blood samples obtained in this part of the Region. The OBRC may decide to re-examine their records on their database of large skuas as to assigned identity (22 records within the 1962-2005 period).

Arabian Sea – Gulf Offshore Records

The vast majority of records of skuas at sea and on migration in the OSME Region relate to individual birds or small flocks, which generally is the norm (Cramp & Simmons 1986). The very recent trend of pelagic trips, mostly off Oman, may inform skua movements in future, but for this paper, offshore skua records (1951-2003) come mostly from the RNBWS database, which is subject to a constant validation process to dispense with records deemed inadequate. Because the RNBWS records are largely dependent on competent observers happening to be on a ship passing through the OSME Region, the database is of random rather than systematic observations. Nevertheless, there are some 38 records of northern hemisphere skuas in the Arabian Sea from the Gulf of Aden through the Gulf of Oman to Kuwait, 10 being in return migration months, 7 in outward migration months, 12 in winter months and the remainder being 'loafers' in summer – presumably non-breeders, immatures or juveniles. At least 150 birds are positively recorded, and a few other entries cite such as 'many', 'occasional sightings' or '3 out of 12 positively identified'. 23 records were of Pomarine

Table 7. Iranian records of Arctic Skua *Stercorarius parasiticus* and Pomarine Skua *S. pomarinus* between 1971 and 2004. **Key**: M = Migration season, O = Outward migration, R = Return migration, W = Winter.

Species	Date	M	Location	No	Remarks
Skua sp	01 Dec 1972	W	Gorgan Bay, Miankaleh Peninsula, Mazandaran	3	DA Scott *in litt.* Very bad weather
Skua sp	13 Sep 1975	O	E end of Miankaleh Peninsula, Mazandaran	1	DA Scott *in litt.*
Skua sp	15 Sep 1975	O	Offshore Miankaleh Peninsula, Mazandaran	2	DA Scott *in litt.*
Skua sp	Feb 2004	W	Qeshm island, off Qeshm town	1	DA Scott *in litt.*
Arctic Skua	10 Jan 1971	W	On shore W of Bandar Anzal, Gilan,Caspian	1ad	DA Scott *in litt.*
Arctic Skua	15 Sep 1971	O	W end Anzali Mordab, Gilan, Caspian	1ad	DA Scott *in litt.*
Arctic Skua	01 Dec 1972	W	Flying S into Gorgan Bay, Miankaleh Peninsula	15	DA Scott *in litt.* Very bad weather
Arctic Skua**	16 Jan 1974	W	Caspian Sea, off Now Farahabad, Mazandaran	3	GA Atkinson-Willes via DA Scott *in litt.*
Arctic Skua	13 Sep 1975	O	E end of Miankaleh Peninsula, Mazandaran	4	DA Scott *in litt.*
Arctic Skua	15 Sep 1975	O	On shore Miankaleh Peninsula, Mazandaran	1imm	DA Scott *in litt.*
Arctic Skua	26 Apr 1998	R	Straits of Hormuz, Bandar Abbas	3	Pale-phase. BirdQuest tour, DA Scott (leader) *in litt.*
Arctic Skua	28 Apr 1998	R	Miankaleh Peninsula	2	BirdQuest tour, via B Yelland, DA Scott (leader) *in litt.*
Arctic Skua*	15 Jan 2001	W	Khor-e-Tiab, Hormozgan Province	1	Midwinter counts, M Sehatti-Sabet *in litt.*
Arctic Skua	13 Apr 2001	R	Beach-front, Bandar Abbas	2	BirdQuest tour, DA Scott (leader) *in litt.*
Arctic Skua	13 Apr 2001	R	Hara Protected Area, Hormozgan	2	BirdQuest tour, DA Scott (leader) *in litt.*
Arctic Skua*	22 Jan 2002	W	Helle Protected Region	1	Midwinter counts, M Sehatti-Sabet *in litt.*
Arctic Skua*	12 Jan 2004	W	Caspian Coast, Hashtpar-Anzali	1	Midwinter counts, M Sehatti-Sabet *in litt.*
Pomarine Skua	02 Mar 1973	R	E end Miankaleh Peninsula, Mazandaran	1imm	DA Scott *in litt.*
Pomarine Skua	15 Sep 1973	O	Caspian Sea off Miankaleh Peninsula	1imm	DA Scott *in litt.*
Pomarine Skua	28 Sep 1973	O	E end Miankaleh Peninsula, Mazandaran	1imm	DA Scott *in litt.*
Pomarine Skua	27 Nov 1975	W	Flying S Ashuradeh, Miankaleh Peninsula	1	DA Scott *in litt.*
Pomarine Skua	26 Feb 1976	W	Between Bandar Abbas & Qeshm island	1	Ben King via DA Scott *in litt.*
Pomarine Skua*	17 Jan 2000	W	Gulf Coast, Bandar-e-lengeh-Gavbandy	1	Midwinter counts, M Sehatti-Sabet *in litt.*
Pomarine Skua*	12 Jan 2004	W	Caspian Coast, Hashtpar-Anzali	1	Midwinter counts, M Sehatti-Sabet *in litt.*
Pomarine Skua*	21 Jan 2004	W	Caspian Coast, Chalus-Babolsar	1	Midwinter counts, M Sehatti-Sabet *in litt.*

Skua, but only 8 were of Arctic, and 2 of Long-tailed, the remainder not being identified as to species. The RNBWS database' Pomarine and Arctic Skua records from the western coast of the Indian subcontinent or offshore spread of dates that do not rule out an offshore wintering area. Interestingly, there were also 10 records of 'large' skuas, whose species attribution we will leave undefined within the area of interest, and 7 others to the south and east, the dates slightly favouring immatures and non-breeders during the southern breeding season.

Red Sea, Egypt, Israel and adjacent eastern Mediterranean

In addition to those records in Meininger & Sørensen (1986), we obtained a few older records of skua sightings in the Red Sea, mostly shore-based (Effie Warr pers comm), but here we also include some offshore records from the Gulf of Aden up through the Red Sea from the RNBWS database (two large skuas, one Pomarine and two Arctic). For the Port Said-Gulf of Suez area, the RNBWS database has 6 records in return migration months, three in outward migration months and 5 in winter, involving 26 birds: - two singleton Great Skua records at Port Said (1960 & 1964), 4 Pomarine Skua records – three singletons at Port Said (1964 & 2001) and the fourth record of three birds transiting the Suez Canal at Little Bitter Lake (1988) – and 8 Arctic Skua records, two in the Bay of Suez (7 birds, 1963), the others (11 birds, 1963, 1965, 1967, 1988, 2001) in or near Port Said. Some of these records are the same as those cited in Meininger & Sørensen (1986), but all appear to be of the same order. These numbers by themselves support the idea of an opportunist rather than established migration route through Egypt along the Suez Canal, but since the 1980s the growth of birdwatching at the northern end of the Gulf of Aqaba through Israel has helped confirm that the established return migration route in this area has a longer overland component than the Suez option – this had been suggested by Meininger & Sørensen (1986).

Yoav Perlman: "Overland skua migration over Israel seems to be regular, and in relatively large numbers. All records I remember are in spring, when flocks are seen to migrate north from the Gulf of Aqaba almost daily - all three *Stercorarius* species. I remember seeing flocks of tens of Arctics a few times myself, and I can recall a record by Tomer Landsberger of 29 Long-tails migrating north over Eilat in spring 2005. After leaving Eilat, the skuas gain great altitude, and are rarely seen over the Arava valley, although I recall a record by Daniel Gelbart of about 120 skuas (*qv*) over the southern Arava. Records from the north of Israel are very few and in tiny numbers".

The Gelbart skua sighting occurred at 05:50 on 24 May 2001 at North Beach. 'A group of about 60 skuas at a high altitude came in from the sea and continued northwards overland. Towards the north, there was another group of about 50 skuas that had already passed. Although both groups were provisionally assessed as Arctic rather than Pomarine, at the same time another group of skuas, 24 Arctic, 8 Pomarine and two Long-tailed Skuas remained close to shore but did not continue north and so it is quite possible that the first two groups at high altitude were similarly constituted' (Daniel Gelbart pers comm citing own notes).

Another possibly relevant skua sighting, made during a European Honey Buzzard *Pernis apivorus* survey at 700m asl, was of three pale-phase adult Arctic Skuas migrating north over the Eilat mountains, at Mount Yoash, 8km inland from the Red Sea, on 21 May 2002. The skuas passed 300m above the survey point, but below the stream of Honey Buzzards (Daniel Gelbart pers comm). These recent records confirm the suppositions by Meininger & Sørensen (1986) that skuas on return migration soar to altitude at the Eilat coast and migrate onwards out of sight, and that this is a

significant, if minor, overland migration route in spring. Meininger & Sørensen (1986) and Shirihai (1996) both suggest that loop migration may occur, outward migration taking the Mediterranean coastal route at least as far as the Suez Canal and the Nile, the return concentrating through Eilat. However, that assumes that the same populations are involved, which is not yet proven, although dark-morph Arctic Skuas have been quite commonly recorded. Dark-morph Arctic Skuas mostly come from populations south of the tundra – in this case from locations from NW Russia westwards and southwards. (Although Pomarine Skua has a dark morph, it comprises 5-20% of all breeding populations) (Furness 1996). Furthermore, there are few data concerning overland outward migration across Sinai or along the north-south watercourses. Diurnal soaring birds may have escaped notice along Egypt's Mediterranean coast, but if the movement overland were nocturnal, detection would be near-impossible. In Greek waters, Arctic Skua is a widespread but scarce passage migrant (Akriotis & Handrinos 1997), which aligns with its status from the Bosphorus to the Dardanelles (Kirwan *et al* in press). One old ringing recovery in Greece (1941) was of a bird ringed near Murmansk, which again suggests overland passage from the breeding grounds into the Black Sea. It is likely that skua movements on the Black Sea west coast are part of the same passage (Dimitrov *et al* 2005). In Greek and Bulgarian waters, the scarcity of Pomarine Skua may be because many have been overlooked (Akriotis & Handrinos 1997, Dimitrov *et al* 2005). The routes by which Great Skua reached Greek waters (5 records, Akriotis & Handrinos 1997) and Bulgarian waters (the only records deemed valid are: 1-4 birds summer and autumn 1986 off Bourgas, 3 birds at Lake Atanasovo in summer 1988, Dimitrov *et al* 2005, Tanyo Michev pers comm). Terns now also are scarce in the eastern Mediterranean, one reason advanced being that since the Aswan Dam reduced the flow of nutrient and replacement material to the Nile Delta, fish stocks have declined, as has the fishing industry, the resultant scarcity of fish driving away terns, and perhaps skuas intending to winter there (Colin Richardson pers comm). Both Pomarine and Arctic Skuas off Lebanon were considered vagrant or extremely rare passage migrants (Ramadan-Jaradi & Ramadan-Jaradi 1999).

Cyprus, Turkey and adjacent seas

The older records reflect a more fragmented (but still well-recorded) approach than of recent decades, but it is likely that Arctic Skua was more frequent in Cyprus waters than the records show, as a scarce but regular passage migrant in spring and autumn. Off the central north coast, 17 (+ three skua sp) were recorded flying west in autumn 1999; 13 were pale-phase. A further bird was recorded in Nov 2003 (Peter Flint pers comm). MB recorded from the Ákamas Peninsula 5 skua sp flying west across Chrysocchou Bay in Oct 1997 and two skua sp flying east off the sea to cross the Zakaki sandspit and Akrotiri Salt Lake in Mar 2002. Pomarine Skua is classed by BirdLife Cyprus as an accidental vagrant in Cyprus waters. It is likely that increased and coordinated seawatching in Cyprus will obtain more sightings of both species.

The most authoritative collation of reliable Turkish records can be found in *The Birds of Turkey* (Kirwan *et al* in press), in which the 26 Pomarine Skua records since 1880 are mainly from the Bosphorus, Aegean and Mediterranean coasts. The 112 Arctic Skua records include several inland at Burdur Gölü, Inner Anatolia (thrice at Kulu Gölü and once at Ereğli marshes) and East Anatolia (Bendimahi, Van Gölü and near Van town) (Guy Kirwan *in litt*). The current status of skuas in Turkey is: Pomarine Skua, rare passage migrant (Kirwan *et al* in press), although there are several recent records of flocks (Guy Kirwan pers comm); Arctic Skua, passage migrant and winter visitor; Long-tailed Skua, perhaps only a vagrant (8 records, Kirwan *et al* in press), and Great Skua, vagrant (6 records, 4 of which lack or are supported by little documentary

evidence; 4 of the 6 records are winter records) (Kirwan *et al* in press, Kirwan *et al* 1999[1]). The *Birds of Turkey* cites the original references contained in former compilations of Turkish bird species, *eg* Kasparek (1986, 1992) and the Turkey Bird Reports (Kirwan & Martins 1994, 2000, Kirwan *et al* 2003).

Off the Turkish Black Sea coast, scattered winter sightings of Arctic Skua (*eg* 7 in 6 days – Jan 1997 – at 6 locations, 5 dark-phase, two pale-phase: Geoff Welch pers comm) suggest that it winters regularly in the Black Sea in small numbers, certainly in years without prolonged harsh weather. The Kuşbank (2007) database contains only two other winter records, an April record, and also an inland record at Kulu Gölü for 30 Jan 2004. Correlation of Kuşbank data with information published elsewhere in English would be a worthwhile aim.

We conclude that Arctic, and quite possibly Pomarine Skuas, make regular use of a route involving the Bosphorus (not necessarily always crossing the sea) and the Sea of Marmara, thence probably along the Aegean coast, but, given the propensity of Arctic Skua for overland movement, the possibility of most birds flying more or less due south in autumn from the Black Sea cannot be discounted. For example, a most likely route would be for birds to follow the Sakarya River from the coast (about midway between Istanbul and Zonguldak), south and east to the vicinity of Polatlý, near the edge of the Central Plateau, where they could head southwest towards Antalya, taking them over Eğirdir, Beyşehir and Burdur lakes, although this is not exactly a direct route. Alternatively, from the plateau, they could head southeast towards Adana, taking them over Kulu and Tuz. Another route would be south and west from the Kızılırmak River delta to Ankara, thence over Kulu (which lake has several records during passage periods, including one of Long-tailed Skua, in 1991) and Lake Tuz towards Adana (routes suggested by Geoff Welch).

Cramp & Simmons (1986) observed that inland skua records reported to them comprised mostly single birds, sometimes two and rarely more. This accords with Turkish records (Guy Kirwan pers comm). The broad scatter of records suggests one or a combination of the following options: low-intensity of passage corridors, broad-front passage, or that migratory corridors are considerable in number (Guy Kirwan *in litt*).

A more easterly route crosses many high mountain chains, and it may be that it is regularly used by several other species. The Turkey Bird Reports mention records at Van Lake of Black-throated Diver *Gavia arctica* and Long-tailed Duck *Clangula hyemalis* as well as Pomarine, Arctic and Great Skuas during passage periods.

Given the enthusiasm and growing expertise of the increasing number of Turkish birdwatchers who submit their records to the Turkey Bird Report and electronically to Kuşbank, it is likely that our knowledge of skua occurrence and migration patterns in and near Turkey will soon increase.

SKUAS AND TUNDRA CYCLES

It would be an obvious suggestion that skua numbers observed on migration are affected by breeding success, which for some species depends on tundra-based biological cycles. Low concentrations of prey in any year in the breeding grounds certainly correlate with reduced *Stercorarius* skua fledging rate. However, Arctic Skua is not lemming-dependent and may nest in more widespread fashion, hunting other bird species when lemmings are scarce (Ims & Fuglei 2005). Furthermore, Long-tailed Skua is able to adapt to some extent to other prey and food sources such as large

insects (Ims & Fuglei 2005), but it is more site-faithful than Pomarine Skua. The latter can form large flocks in the Arctic in search of lemming-rich areas, which in the main are inland. All mammal and avian predator numbers follow the lemming cycle to a greater or lesser extent, but adult Pomarine skuas of course can move elsewhere inland, sometimes for long distances (Korpimäki *et al* 2004). In lemming-poor years, skuas may move to the coast, where prey species variation and mammal predators are more consistent in number (Ims & Fuglei 2005). However, a poor breeding season will not greatly affect adult *Stercorarius* skua numbers, skuas being long-lived seabirds – in those years, skua chick survival is also affected by increased mammal predation (mostly by Arctic fox *Alopex lagopus*) and by high mortality from sibling aggression. We suggest the hypothesis that when lemmings are scarce, the tendency for Pomarine Skuas to form large flocks increases the chance that a higher proportion of birds will migrate by sea routes, because the 'peer pressure' of flocking lasts longer.

However, a factor that may have stabilised the lemming cycle in its present form is the presence in sufficient years of snow depths that permit the lemmings in winter or late spring to initiate population build-up when concealed (Ims & Fuglei 2005), thus minimising predator-control mechanisms (Korpimäki *et al* 2004). If annual snow depths diminish or disappear with time in line with the general warming of the tundra that has been recorded since the 1990s, then the lemming cycle could flatten out to low levels, thus reducing prey biomass available to skuas. Quite how other prey species within the overall tundra ecosystem will be affected by the warming process is uncertain, but if most diminish, so will skua numbers overall, although doubtless we would see some adaptation by Long-tailed and Arctic skuas. The trends at the western tundra limits are discouraging – Snowy Owl *Bubo scandiaca* (BirdLife International 2005) and Arctic Fox are declining rapidly in Fennoscandia (Ims & Fuglei 2005). The breeding population of Snow Goose *Chen caerulescens* on Wrangel Island formerly achieved breeding success only once in every four years, when the snowpack melted sufficiently early. They have bred successfully every year since 2002, the wintering population in Washington State USA doubling to 83 000 birds since 1997 (McKenna 2007). The average increase in temperature in March, April and May on Wrangel since 1977 is 2ºC, consistent with changes in the Arctic as a whole, as measured by the International Arctic Research Center in Fairbanks Alaska (McKenna 2007). Should this trend continue, it bodes ill for skuas and all Arctic fauna and flora.

DISCUSSION

The difficulties of studying overland skua movements are immense. Not only are the areas vast, but average observer density is exceptionally low year-round. Although the extent of loop migration probably is much greater than hinted at where totals recorded favour spring or autumn counts, the effect may well be masked by the impact of poor breeding seasons. Food shortages at or bad weather on the breeding grounds may well allow earlier departures by failed breeders, and adverse weather during the early stages of return migration may favour the build-up of concentrations of migrant skuas before major overland route sectors. Food shortages on the breeding grounds are usually linked to tundra cycles (*qv*), mostly concerning lemming numbers, on the breeding grounds. Furthermore, the extent of wandering in the world's oceans by individual birds, particularly before they are old enough to breed, is extraordinarily difficult to quantify. There is no reliable method of distinguishing in goal areas migrant birds from wanderers at sea from about October to February. However, there are tantalising glimpses of what might represent the true extent of wandering. For example, of Arctic Skuas ringed on their Scottish breeding grounds there have been four recoveries of unexpected wanderers – two from the eastern

Mediterranean and remarkably one each from central Sudan and the Congo Basin (Wernham *et al* 2003), quite a recovery rate for 'off the beaten track' individuals. The species winters along the shores of the southern continents in the main, and so the surmise that birds encountered in the Indian Ocean had wandered round southern Africa seemed reasonable, as mentioned by Meininger & Sørensen (1986), but ringing recoveries of Scottish birds from the eastern Mediterranean raise the possibility that the overland route to the Indian Ocean was a plausible alternative (Furness 2002a).

To guarantee a food supply en route, skuas on overland passage could track migratory shorebirds, much as wolves track caribou in the Nearctic. Shorebird flyway populations, especially at choke points or at major resting sites, seem an ideal source of prey, but observations of such as Ruff *Philomachus pugnax* migrating westward along the northern tundra so far have not suggested anything other than opportunistic predation, which may be more common behaviour along established skua migration routes than previously believed (Kolbjørn Schjølberg pers comm). The lack of records of groups travelling overland supports the idea of opportunistic feeding en route. The numbers recorded in the central Caspian could be explained by low-intensity passage resulting in accumulating totals, but it seems that low-intensity passage is maintained, because these observations characteristically emphasise movement of small groups over a period of several days. Undoubtedly, individual birds will remain in the southern Caspian area, if conditions remain sufficiently clement. We could not find any data on whether overland migration occurs in a number of preferred corridors or on a broad front. Skuas have also been observed attacking landbirds over the sea off Oman (Schjølberg 2006).

Skuas on migration over sea feed more on fish than at other times (Cramp & Simmons 1983), but have regularly been recorded killing small mammals and other bird species, including gulls, for food (Cramp & Simmons 1983). The extent of en-route predation of other migrant species simply is not known, nor is the route consistency of skuas on overland passage. Nevertheless, skuas making long overland journeys must do so in an energy-efficient way if they are to survive. Returning to Bannon's (1993) observations of skuas that appeared to have crossed the Empty Quarter, there are two aspects of this journey, assuming it to be regular behaviour, that merit some attention. Firstly, a 900km direct journey from near Salalah on Oman's south coast due north to Dubai must be as energy-efficient as, or better than, an oversea route of 1700km. Hypothetically, the energy demands of a short route are always less than a long route, but the flight techniques on these two routes must differ. Thermals over the sea are scarce and usually only over shallow seas and so seabirds make use of two low-altitude phenomena to assist them. One is 'ground-effect' where just above the surface the compression of air reduces the lift required (best demonstrated by pelicans), and the other is 'wind-induced vorticity', where many vortices form downwind of a wave, allowing birds to make use of the upward-rotating component (best demonstrated by shearwaters and gannets). Skua-sized seabirds can apply both techniques over the sea. Over land, soaring flight in thermals provides the most efficient flight technique that skuas could use, as reported by Meininger & Sørensen (1986), Bannon (1993) and Daniel Gelbart (pers comm). Skuas commonly use flapping flight for extended periods, and so a lengthy overland journey such as that proposed by Bannon (1993) would require both flapping and soaring flight. His observations all occurred in the last hour before dusk, implying that the birds had flown in daylight across the northern part of the Empty Quarter, where the very warm air at low and medium altitudes can be severely turbulent (MB can confirm this from painful personal experience in small aircraft). Assuming a minimum migration groundspeed of 50km/h on the overland 900km, we

are left with a minimum overland flight time of 18 hours. At this time of year, daylight in eastern Saudi Arabia lasts about 12 hours, the onset of darkness being around 1900 local time, which would require the overland flight to begin at around 0100. If landfall on the Arabian Sea coast near Salalah occurs at this time, it suggests that a clear sky with enough moonlight is essential for the birds to avoid the mountains that lie variously on the coast, or where there is a coastal plain, inland. Of course, the use of overnight ground roosts en route cannot be ruled out, but a single continuous journey may be the more regular option, given the lack of diurnal invertebrate prey en route. Radio-tracking is the only answer to this puzzle, but catching a skua that is going to travel overland is problematical.

THE FUTURE

Given that conservation organisations within the OSME Region and elsewhere often give priority to identifying flyways overland, it seems to us that much valuable data could be obtained on skua and other seabird movements through enclosed and relatively narrow seas – *eg* the Caspian and Black Seas, the Gulf of Oman – fairly simply and cheaply. We encourage BirdLife International to develop with its partner organisations methods of obtaining regular and systematic observations in such areas. In the Caspian and wherever there are oil and gas platforms, the industries concerned might consider that supporting such a cause by allowing a programme of regular observations to be mounted would bring plaudits, rather than the usual criticism, of high environmental risks being taken. A programme of regular pelagic trips undoubtedly would be a source of invaluable data. Once the degree of regularity of the migration patterns can be established, it is likely that firmer conclusions could be reached on several aspects: the effects of the tundra cycle on yearly skua numbers on migration, the stability of overland passage, location and number of overland routes and whether overland migrants come largely from certain sub-populations.

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PRIMARY REFERENCES

Abuladze, AV. 1998. [Skuas on the Black Sea coast of the Caucasus]. *Kavkaz. orn. Vestnik.* [*Caucasian Orn. Bull.*] **10**: 4-6. [In Russian].

Akriotis, T and G Handrinos. 1997. The Birds of Greece. Christopher Helm. London. UK.

Andersson, M. 1999. Phylogeny, behaviour, plumage evolution and neoteny in skuas Stercorariidae. *J. Avian Biol.* **30(2)**: 205-215.

Arkhipov VYu and EA Zhuravlev. (In press). Expedition to the areas of autumn stopovers of Lesser White-fronted Goose (Kostanay Aktubinsk regions, North Kazakhstan) 12-17 October 2006. *Kazakhstan Ornithological Bulletin*.

Ayrumian, KA, MS Adamian and NA Margarian. 1968. [On the occurrence of *Stercorarius pomarinus* in Armenia]. *Ornitologiya* **9**: 335-336. [In Russian].

Aspinall, S. 2005. Azerbaijan: a miscellany of recent bird observations (Status and occurrence of selected visiting species and amending known breeding ranges). *Sandgrouse* **27 (1)**: 46–52.

Bannon, JK. 1993. Do skuas overfly the Rub al Khali on spring passage to the Arabian Gulf? *Emirates Bird Report*. **17**: 56-57.

Berthold, P. 2000. Bird migration – a general survey, 2nd edn. OUP. Oxford. UK.

Bourne, WRP. 1991. The Seabirds of Arabia. *Sea Swallow* **40**: 4-12.

Bourne, WRP. 1999. (Ed). Observations of Seabirds: Average waterbirds/day seen by Chief Engineer SJ Hingston in the oilfield safety vessel MV *Tabriz Khalilbeyi* in the central Caspian Sea, 1997. *Sea Swallow* **48**: 23.

BOURNE, WRP. 2000. (Ed). Observations of Seabirds: Average seabirds/day seen by Chief Engineer SJ Hingston in the oilfield safety vessel MV *Tabriz Khalilbeyi* at 40°05'N 51°15'E in the Caspian Sea in 1998. *Sea Swallow* **49**: 23.

BOURNE, WRP AND MB CASEMENT. 1996. The migrations of the Arctic Tern. *Bull. Brit. Orn. Club* **l16**: l17-l23.

BRAUN, MJ AND RT BRUMFIELD. 1998. Enigmatic phylogeny of skuas: an alternative hypothesis. *Proc. Biol. Sci.* **265 (1400)**: 995-997.

COHEN, BL, AJ BAKER, K BLECHSCHMIDT, DL DITTMANN, RW FURNESS, JA GERWIN, AJ HELBIG, J DE KORTE, HD MARSHALL, RL PALMA, H-U PETER, R RAMLI, I SIEBOLD, MS WILLCOX, RH WILSON AND RM ZINK. 1997. Enigmatic phylogeny of skuas (Aves Stercorariidae). *Proc R Soc Lond* **B 264**: 181-190.

DEMENT'EV, GP. 1952. [*The Birds of Turkmenistan*.] Academy of Sciences of the Turkmen SSR. Ashkebad. Turkmen SSR.

DEMENTYEV, GP, NA GLADKOV AND YEP SPANGENBERG. 1951. *Ptitsy Sovetskogo Soyuza 3*. [*Birds of the Soviet Union*]. Sovetskaya Nauka, Moscow. [In Russian]. [English translation: Israel Program for Scientific Translations, Jerusalem, 1969]

DIMITROV, M, T MICHEV, L PROFIROV AND K NYAGOLOV. 2005. [*Waterbirds of the Bourgas Wetlands: results and evaluation of the monthly waterbird monitoring 1996-2002*]. Bulgarian Biodiversity Foundation and Pensoft Publishers. Sofia and Moscow. pp160. Bulgaria and Russia.

DOLGUSHIN, IA. 1962. [Lariformes. *Birds of Kazakhstan 2*]. Alma-Ata: 246-327. [In Russian.]

DUDLEY, SP, M GEE, C KEHOE AND TM MELLING. 2006. The British List: A Checklist of Birds of Britain (7th edition). *Ibis* **148 (3)**: 526-563.

ESKELIN, T AND P TOLVANEN. 2000. Annotated checklist of bird observations during the Lesser White-fronted Goose surveys in Kazakstan, October 1999. **In**: *Fennoscandian Lesser White fronted Goose conservation project – Annual report 1999*: 64-67.

FEFELOV, IV, II TUPISTIN, VA PODKOVIROV AND VE ZHURAVLEV. 2001. [*Birds of the Selega Delta*.] Irkutsk. [In Russian]

FURNESS, RW. 1987. *The Skuas*. T&AD Poyser. Calton. Staffs. UK.

FURNESS, RW. 1996. *Family STERCORARIIDAE (SKUAS)*. **In**: DEL HOYO, J, A ELLIOT AND J SARGATAL**.** (Eds). *Handbook of the birds of the World: Vol 3*. Lynx Edicions. Barcelona. Spain.

FURNESS, RW. 1997. Arctic, Long-tailed and Great Skuas. **In**: HAGEMEIJER EJW AND MJ BLAIR. (Eds). *The EBCC Atlas of European Breeding Birds*. T&AD Poyser. London. UK. pp320-322.

FURNESS, RW. 2002A. Arctic Skua. **In**: WERNHAM, C, M TOMS, J MARCHANT, J CLARK, G SIRIWARDENA AND S BAILLIE. (Eds). *The Migration Atlas: Movements of the birds of Britain and Ireland*. T&AD Poyser. London. UK.

FURNESS, RW. 2002B. Great Skua. **In**: WERNHAM, C, M TOMS, J MARCHANT, J CLARK, G SIRIWARDENA AND S BAILLIE. (Eds). *The Migration Atlas: Movements of the birds of Britain and Ireland*. T&AD Poyser. London. UK.

FURNESS RW AND YUN MINEYEV. 1997. Pomarine skua. **In**: HAGEMEIJER EJW AND MJ BLAIR. (Eds). *The EBCC Atlas of European Breeding Birds*. T&AD Poyser. London. UK. p319.

GAGINA, TN. 1962. [Vagrant birds of East Siberia.] *Ornithologia* **4**: 367-372. [In Russian].

GAVRILOV, E AND A GAVRILOV. 2005. *The Birds of Kazakhstan (abridged edition)*. Tethys Society. Almaty. Kazakhstan.

GOODMAN, SM AND PL MEININGER. 1989. (Eds). *The Birds of Egypt*. OUP. Oxford. UK

DEL HOYO, J, A ELLIOT AND J SARGATAL. 1996. (Eds). *Handbook of the birds of the World: Vol 3*. Lynx Edicions. Barcelona. Spain.

GUBIN, BM AND AS LEVIN. 1980. [*Seasonal migration of birds in the middle reaches of the Ural River (Kazakhstan). Migration of birds in Asia*]. Dushanbe. Tadzhik SSR 154-191. [In Russian].

IMS, RA AND E FUGLEI. 2005. Trophic Interaction Cycles in Tundra Ecosystems and the Impact of Climate Change. *BioScience* **55 (4)**:311-322.

INSKIPP, N LINDSEY AND W DUCKWORTH. 1996. *An Annotated Checklist of the Birds of the Oriental Region*. Oriental Bird Club. c/o The Lodge, Sandy. UK.

IZMAILOV, IV. 1967. [*Birds of Vitimski Plateau***.]**Ulan-Ude. [In Russian].

KALABIN, SYU. 1984. [A vagrant record of Arctic Skua in the Uzbekistan. *Migration of birds in Asia*]. 129. Tashkent. Uzbek SSR [In Russian].

KASHKAROV, DYU AND MM OSTAPENKO. 1990. [*The Birds of Uzbekistan*.] Fan Publishing. Tashkent. Uzbek SSR. [In Russian].

KASPAREK, M. 1986. Zum Vorkommen einiger in der Türkei seltener Vogelarten. *Bonn. Zool. Beitr*. **41**:181-202.

KASPAREK, M. 1992. *Die Vogel der Türkei: eine Übersicht*. Kaspark Verlag. Heidelberg. Germany.

KHLEBNIKOV, VA. 1928. [*Checklist of birds of the Astrakhan region and their distribution according of character of stay in the region*.] [*Materials on the study of nature of Astrakhan region*.] **1 (3)**: 1-40. [In Russian].

KHOKHLOV, AN. 1990. [On some scarce, poorly known and vagrant birds of the Stavropol region]. [*Rare, scarce and poorly known birds of the Northern Caucasus*]. (*Materials of conference 23 – 28 April 1990, Stavropol*): 96 – 101.

KHOKHLOV, AN. 2000. [The animal fauna of the Stavropol' Territory (terrestrial vertebrates and their distribution): a textbook for special courses at modern educational establishments]. Stavropol' servis-shkola. Stavropol'. [In Russian].

KIRWAN, GM AND RP MARTINS. 1994. Turkey Bird Report 1987-91. *Sandgrouse* **16(2)**:76-117.

KIRWAN, GM, RP MARTINS AND G EKEN. 1999. Checklist of the birds of Turkey. *Sandgrouse Supp.* **1**.

KIRWAN, GM AND RP MARTINS. 2000. Turkey Bird Report 1992-1996. *Sandgrouse* **22(1)**:13-35.

KIRWAN, GM, M ÖZEN, B KURT AND RP MARTINS. 2003. Turkey Bird Report 1997-2001. *Sandgrouse* **25(1)**:8-31.

KIRWAN, GM, KA BOYLA, P CASTELL, B DEMIRCI, M ÖZEN, H WELCH AND T MARLOW. (IN PREP). The birds of Turkey: a study of the distribution, taxonomy and breeding of Turkish birds. Christopher Helm. London.

KORPIMÄKI, E, PR BROWN, J JACOB AND RP PECH. 2004. The Puzzles of Population Cycles and Outbreaks of Small Mammals Solved? *BioScience* **54 (12)**:1071-1079.

KOSTIN, YUV. 1983. *Birds of Crimea*. Nauka. Moscow.

KRIVITSKIY, IA, VV KHROKOV, EN VOLKOV AND VA ZHULIY. 1985. [*Birds of Kurgalgzhinskiy reserve*]. Alma-Ata Kazakh SSR [In Russian]

LEE, W, T KOO AND J-Y PARK. 2000. *A Field Guide to the Birds of South Korea.* Evergreen Foundation. Seoul. South Korea.

LUGOVOY, AYE. 1963. [Birds of the Volga River Delta]. *Proceedings of Astrakhan Reserve* **8**: 9-185. [In Russian].

MALLING OLSEN, K AND H LARSSON. 1997. *Skuas and Jaegers*. Pica Press. Robertsbridge. Sussex. UK.

MEININGER, PL AND UG SØRENSON. 1986. The occurrence of Skuas (Stercoraridae) in the Middle East, with special reference to Egypt and the northern Red Sea. *Vogelwarte* **33b (4)**: 281-294.

MELNIKOV, YUI. 1998. [Encounters with Pomarine Skua *Stercorarius pomarinus* on Lake Baikal]. *Russ. J. Orn.* (Express-issue). **46**: 22. [In Russian].

MCKENNA, P. 2007. Snowy invaders point to Arctic thaw. *New Scientist* **194: 9**. (No 2598, 01 Apr 07).

MOORES, N. (In press). Selected records from Socheong island, South Korea. *Forktail*.

MOSEYKIN, VN, LV MALOVICHKO AND EV MOSEYKIN. 2003. [A vagrant record of Long-tailed Skua in the Stavropol' Territory]. *Kavkaz. orn. Vestnik* **15**: 116. [In Russian].

PIERSMA, T, GA GUDMUNDSSON AND K LILLIENDAHL. 1999. Rapid changes in the size of different functional organ and muscle groups during refuelling in a long-distance migrating shorebird. *Phys. Biochem. Zool.* **72**: 405-415.

PIZHYANOV, SV, II TUPISTIN AND NN SAFRONOV. 1998. [New avifauna of the Baikal coast.] *Proc. Baikalo-lenski State Nature Reserve*. Moscow. **1**: 99-102. [In Russian].

PORTER, RF, S CHRISTENSEN AND P SCHIERMACKER-HANSEN. 1996. *The Field Guide to the Birds of the Middle East*. T&AD Poyser. London.UK.

RAMADAN-JARADI, G AND M RAMADAN-JARADI. 1999. An updated Checklist of the birds of Lebanon. *Sandgrouse* **21 (2)**: 132-170.

RICHARDSON, C. 1987-2002. (Compiler). Skua records extracted from: *Emirates Bird Report, 1987-2002*.

ROGACHEVA, H. (YE). 1992. *The Birds of Central Siberia*. Husum Druck. Husum. Germany.

SANGSTER, G, JM COLLINSON, AJ HELBIG, AG KNOX AND DT PARKIN. 2004. Taxonomic recommendations for British birds: second report. *Ibis* **146**: 153-157.

SAVITSKIY, RM AND NV LEBEDEVA. 2003. [Pomarine Skua on the coast of the Kerch Strait]. *Kavkaz. orn. Vestnik* **15**: 120–121. (In Russian).

SAVITSKIY, BP AND AN POSLAVSKIY. 1977. [A vagrant record of Pomarine Skua in the north-west Caspian region]. *Ornitologiya* **13**: 194. (In Russian).

SCHERBINA, AA. 1977. [A record of Pomarine Skua in Turkmenia]. *Ornithologia* **13**: 200. [In Russian].

SCHJØLBERG, K. 2006. A note on predatory and parasitic behaviour of *Stercorarius* skuas migrating off Muscat, Oman. *Sandgrouse* **28(2)**: 161-162.

SCOTT, DA AND A ADHAMI. 2006. An Updated Checklist of the Birds of Iran. *Podoces* **1 (1/2)**: 1-16.

SHEVCHENKO, VL, PV DEBELO, EI GAVRILOV, VA NAGLOV AND AK FEDOSENKO. 1993. [On the avifauna of the Volga-Ural interfluve]. *Fauna and Biology of birds of Kazakhstan.* Almaty. Kazakh SSR 7-103. [In Russian.]

SHIRIHAI, H. 1996. *The birds of Israel.* Academic Press. London. UK.

SMOGORZHEVSKY, LO. 1959. [*Ichthyophagous birds of Ukraine*]. Kiev University Press. Ukraine SSR [In Ukrainian].

SNOW, DW AND PERRINS, CM. 1998. *The Birds of the Western Palearctic. Concise Edition (2 vols).* OUP. Oxford. UK.

SOTNIKOV VN. 2002. [*Birds of the Kirov region. Non-Passeriformes. Vol 1 Part 2*]. Kirov Publishers. [In Russian].

SPANGENBERG, YEP AND GA FEYGIN. 1936. [Birds of the Lower Sir-Daria and adjacent territories]. *Proc. State Zool. Mus. Moscow Univ.* **3**:41-184. (In Russian).

STROKOV, VV. 1974. [Wintering waterbirds on the Black Sea shore in the Caucasus]. *Ornithologia* **11**: 274-278. [In Russian] .

TOLCHIN, VA, SI LIPIN AND YUI MELNIKOV. 1974. [New data on bird distributions in the Baikal area. *Materials of the 6th All-Union Ornithological Conference*]. Moscow, **1**: 244 – 245. [In Russian].

TOMEK , T. 1999. The birds of North Korea. Non-Passeriformes. *Acta Zool. Cracov*. **42 (1)**: 1-217.

VOLET, B, H SCHMID AND R. WINKLER. 2000. Liste der Vogelarten der Schweiz/Checklist of the birds of Switzerland. *Ornith. Beob.* **97**: 79-103

WASSINK, A AND GJ OREEL. 2007. *The Birds of Kazakhstan*. Arend Wassink. De Cocksdorp. Texel. The Netherlands.

WERNHAM, C, M TOMS, J MARCHANT, J CLARK, G SIRIWARDENA AND S BAILLIE. 2002. (Eds). *The Migration Atlas: Movements of the birds of Britain and Ireland*. T&AD Poyser. London. UK.

ZALETAEV VS. 1953. [Skuas on the Caspian Sea]. *Priroda* **10**: 17. [In Russian].

ZARUDNY, NA. 1888. [*Ornithological Fauna of the Orenburg Region*]. Notes of the Empire Academy of Science. **57 Supp 1.** St Petersburg. Russia. [In Russian].

ZARUDNY, NA. 1916. [Birds of the Kyzylkum Desert. *Materials and knowledge of the fauna and flora of the Russian Empire, Zool. Sect.*] **14**: 1-49. [In Russian].

SECONDARY REFERENCES

ALDRIDGE, J. 1997. Skuas at Fisherman's Cove, Chennai, India. www.blackbuck.org/blackbuck/vol_14/article1.htm (accessed 14 Sep 2005 *et seq*).

ARCHIVES OF THE BCU (BIRD CONSERVATION UNION) OF GEORGIA. *Interesting records 2001.* http://bcug.narod.ru/2001.html

ARCHIVES OF THE BCU (BIRD CONSERVATION UNION) OF GEORGIA. *Interesting records 2002, 1 January - 30 June*. http://bcug.narod.ru/2002.html

BIRDLIFE. 2007. Austrian Bird Species List. http://www.birdlife.at/s3705_01.htm

MME. 2007. Hungarian Bird Species List. http://www.c3.hu/~mme/nb/hun_list.htm

BLAIR, MJ, RF PORTER AND S ASPINALL. 2007. *The OSME Region List of Birds*. www.osme.org or via ed@osme.org.

KUŞBANK. 2007. On-line (membership) Turkish bird record database. (Skua records: access in progress).

MOORES, N. 2004. Skuas and Jaegers in Korean Waters: a status review. www.koreabirds.org (accessed 14 Sep 2005).

WARD, F. 2005. (Database custodian). Skua records extracted 5 Sep 2005 from: *RNBWS database 1945-2003.*

1 This reference, (**KIRWAN, GM, RP MARTINS, G EKEN AND PAJ DAVIDSON. 1999.** Checklist of the birds of Turkey. *Sandgrouse Supp.* **1**), is often cited as published in 1998, but this is an error, probably prompted by the wrong year being printed inside the front cover of the Supplement.